Notebook, N-07-05-01

Low Capacity E18 Cells. May 1, 1907.

Reversed at temp. of 130° F. for different times at 5 amps

Cell #	Capacity	Time of Reverse	Capacity after Treatment.			Gain.
2294	127	2 weeks @ 5 amps.	117	145	151	19 %
2707	77	" "	87	93	93	20.7 "
3098	90	3 weeks @ 5 amps	116	133	134	48.8 %
3263	47	" "	56	52	53	12.7 "
3277	92	4 weeks @ 5 amps	101	103	102	11 %
3739	71	" "	38	112	146	105 "
5644	91	5 weeks @ 5 amps	93	97	100	10 %
5877	37	" "	83	89	88	138 "

These two reversed at normal temperature.

Cell #	Capacity	Time of Reverse	Capacity after Treatment.			Gain.
2943	90	3 weeks @ 5 amps	110	103	100	11 %
5541	97	4 " "	113	111	112	15.5 "

Jes #2995½ + 96½
Endurance Test

	Cap. Runs when New				50 Runs on Hot Test Changed KOH.
	13	14	15	16	
2995	1972	S.C	1985	2080	
96	1965	2330	2175	2100	

	80	81	82	83	50 Runs on Hot Test Changed KOH.
2995	1490	1385	1372	1417	
96	1747	1690	1700	1625	

	141	50 Runs on Hot Test Changed KOH —	192	194	200
2995	1397		700	690	700
96	1500		985	1175	1075

72	73	74	75	Fully Charg'd + Short Circuited 3 Times.	76	78	79
555	975	1020	1120		1332	1467	1407
975	1240	1425	1500		1770	1832	1745

134	135	136	137	Fully Charg'd + Short Circuited 3 Times.	138	139	140
920	1010	1100	1100		1355	1385	1412
1070	1200	1250	1270		1470	1500	1500

T.A.E. Tubes, Set #4.

NaOH

Average charge and discharge

5876	27 %	1.73	1.19
77	"	1.73	1.192
78	"	1.725	1.185
5879	25 %	1.725	1.202
80	"	1.722	1.202
81	"	1.72	1.205
5882	23 %	1.732	1.217
83	"	1.74	1.205
84	"	1.74	1.207
5885	21 %	1.74	1.22
86	"	1.735	1.217
87	"	1.75	1.217
5888	19 %	1.755	1.21
89	"	1.755	1.21
90	"	1.74	1.22
5891	17 %	1.75	1.235
92	"	1.745	1.23
93	"	1.76	1.225
5894	15 %	1.76	1.22
95	"	1.76	1.215
96	"	1.767	1.22
5897	13 %	1.77	1.222
98	"	1.77	1.232
99	"	1.747	1.22

May 1, 1907.

Solutions, 27 to 13 %.

P.D. on 5 hr. charge @ 200 m-a.

Approximated from curve — not by planimeter.

5/1/07

Tubes, Set #4.

Capacity when 1000 m-a-h is put in at different rates.

Discharges are all at 150 milamps.

To get ampere-hour efficiency of any run, point off one place.

			Chg'd $6\frac{2}{3}$ hrs.@150	Chg'd 5 hrs.@200	Chg'd 4 hrs.@250	Chg'd $3\frac{1}{3}$ hrs.@300
5876	27%	NaOH	790	720	700	652
77	"	"	822	742	720	687
78	"	"	785	700	671	625
5879	25%	"	842	767	743	702
80	"	"	837	756	721	685
81	"	"	835	756	721	685
5882	23%	"	860	782	743	697
83	"	"	820	743	702	668
84	"	"	820	740	702	668
5885	21%	"	820	745	700	650
86	"	"	850	775	731	688
87	"	"	838	765	722	688
5888	19%	"	857	783	731	691
89	"	"	857	771	715	690
90	"	"	843	775	717	672
5891	17%	"	815	722	670	647
92	"	"	862	801	740	700
93	"	"	850	773	712	683
5894	15%	"	827	750	700	648
95	"	"	830	807	662	702
96	"	"	832	751	675	637
5897	13%	"	850	770	710	675
98	"	"	837	763	700	640
99	"	"	822	751	685	662

5/1/07.

Tubes, Set #1.

Capacity when 1000 m-a-h is put in at different rates.
After 50 Hot Runs.
Discharges @ 150 m-a.
To get ampere-hour efficiency, point off one place.
Total number of runs before this is 80.

	Chg'd $6\frac{2}{3}$ hrs @ 150	Chg'd 5 hrs @ 200	Chg'd 4 hrs @ 250	Chg'd $3\frac{1}{3}$ hrs @ 300	Chg'd 5 hrs @ 200 Test made before hot runs – 3/5/07.
5398	723	652	640	595	723
99	700	622	622	562	735
5400	725	660	642	598	723
5401	777	715	700	657	768
02	720	650	640	597	768
03	735	672	655	607	763
5404	716	656	645	610	725
05	757	688	675	632	728
06	706	662	643	600	724
5407	692	632	617	560	697
08	716	640	622	580	725
09	717	650	630	586	740
5410	717	670	667	633	750
11	738	682	681	650	750
12	725	677	673	645	761
5413	708	663	661	633	725
14	715	663	660	630	777
15	723	672	671	645	766
5416	715	658	657	617	747
17	725	675	670	636	758
18	716	666	667	631	747
5419	743	687	685	650	778
20	756	697	695	662	772
21	737	682	677	647	771

5/3/07.

Tubes, Lot #5.

Capacity when charged @ 200 m-a for different lengths of time, and discharged @ 150 m-a to 1V.

		Charged 2 hrs.				3 hrs.		4 hrs		5 hrs.		6 hrs.		7 hrs. 7 [illegible]	
5992	21% KOH	367	382	407	391	581	561	697	691	790	797	882	890	962	937
93	+2g. LiOH	360	388	408	391	587	562	700	693	793	798	895	893	963	937
94		362	395	411	396	597	575	722	711	813	822	910	917	987	960
5995	17% KOH	362	370	406	370	575	540	687	677	775	778	865	862	930	910
96	+2g. LiOH	370	372	408	373	585	542	696	683	780	785	870	867	947	908
97		355	372	406	372	582	641	695	687	777	786	872	872	947	938
5998	13% KOH	337	362	398	358	565	495	663	650	743	746	836	830	900	872
99	+2g. LiOH	345	351	398	355	561	485	665	645	736	736	828	825	897	878
6000		320	342	392	340	545	475	640	622	712	715	798	797	865	857
6001	21% NaOH	330	387	421	393	622	595	747	738	837	841	921	942	998	976
02	+2g. LiOH	425	387	421	386	598	563	733	720	812	821	898	920	973	972
03		432	392	423	392	598	570	738	735	830	841	916	937	996	980
6004	17% NaOH	325	362	407	375	593	555	720	708	807	817	897	910	965	952
05	+2g. LiOH	386	385	413	386	608	573	750	742	850	861	947	960	1015	1005
06		405	385	418	390	625	574	762	750	856	865	956	970	1030	1015
6007	13% NaOH	372	380	415	381	607	567	745	730	840	840	925	935	985	970
08	+2g. LiOH	375	375	417	381	606	566	745	731	841	842	931	940	997	982
09		375	382	417	382	626	568	760	741	851	857	945	950	1000	985

See in back of this book for complete results of tests on all the lots of Tubes. W.E.H.

5/7/07. Cells #440-442. Were reversed once a week on hot test by Hooper.

Fes from Tube Cell #441.

Total number of runs hot + normal = 794.

Reassembled each Fe with four tubes in fresh 21%. KOH. Capacity **to 1.1V.** on overcharge is as follows:

										Cells stood for 2 weeks here.				
441 A	580	1177	990	1180	1170	21%.KOH+SiOH		1210	1275		1480	887	990	980
441 B	585	1075	975	1260	1175	15%.NaOH+SiOH.		885	785		840	577	492	495

Tubes from Cells #440, 441, + 442. Reassembled with new Fes after 794 runs.

440	565	573	Put in 21%. KOH + 2% SiOH		537	482	500	475	Reversed tube against can 16 hrs. @ 300. Kept in same solution	500	478	480
441	661	668			636	592	602	582		600	587	578
442	652	657	15%.NaOH+SiOH		653	637	663	637		637	645	625

5/9/07.

Old Tubes #3, 4, 6, + 8.
After 1320 runs, hot and normal.

												Run @ 115°F.	115°F.	115°F.	115°F.
#3	270	260	Put in 21% KOH + 2g. SiOH	238	243	241	232	233	250	248	253	331	345	361	371
6	334	337		262	315	328	323	318	338	325	332	380	395	396	401
4	301	297	Put in 15% NaOH + 2g SiOH	320	337	330	340	338	350	345	345	403	400	413	425
8	350	357		365	395	402	408	415	433	427	450	480	495	496	508

	Run @ 130°F.	130°F	145°F								
3	387	401	415	302	292	300	Put in 21% KOH	317	342	337	337
6	408	407	417	370	365	375		386	397	397	398
4	437	443	448	367	366	362		367	372	387	372
8	518	525	508	485	490	485		492	502	492	490

5/9/07.

Tubes.

Efficiency in Lower Concentrations of Alkali.
Charged 5 hrs. @ 200 m-a, discharged @ 150 m-a.
Also Capacity on Overcharge given in red.

	In 21 % KOH				
5601	748	737	1155	Average	747
5602	750	747	1157	"	1156.3
5603	758	757	1157		

	In 18 % KOH				
5601	692	690	1150	Average	696.6
5602	696	697	1162	"	1155.6
5603	705	703	1155		

	In 15 % KOH				
5601	690	696	1110	Average	703
5602	700	703	1116	"	1112.6
5603	710	711	1112		

	In 15 % NaOH				
5601		801	1210	Average	810
02		825	1230	"	1218
03		805	1215		

	In 12.8 % NaOH				
5601		797	1171	Average	800
02		805	1187	"	1173
03		798	1163		

	In 10.7 % NaOH				
5601		775	1157	Average	776.6
02		780	1162	"	1152
03		775	1137		

NaOH solutions were made by Louis Ott from stick Soda. Comparable concentrations are figured in ratio of the molecular weights — i.e. — KOH = 56, NaOH = 40.

5/9/07.

Low Capacity E18 Cells. Silicium Treatment.

											Cells marked "x" are now running hot – 130°F.		All at normal temp. again		
#14106	77	Added 10 g. SiOH	92.5	93.5		94.5	93	92	—	97	x 87.5	88	102	102	Jo Sadler 5/24/07
14615	81.5	" 20 g. "	114.5	118.5		119	123	124	—	128.5	x 118	109	133.5	131.5	
14626	89	" 30 g. "	122.5	128		131.5	134	134	Put in 21% KOH	136.5	139	138.7	138	137	
14640	77	" 40 g. "	109.5	113		118	123.5	123		127.5	127.7	131	126.5	130	
14642	83	" 50 g. "	117.5	124		126.5	132	131	—	137.5	x 133	132	142.2	139	
2707	82.5	20 g. SiOH } Reversed 15 hrs. @ 30 amps. Kept in same solution.	92	97		99	99.5	99	—	97.5	Jo Sadler 5/17/07				
5644	89.2	40 g. SiOH }	117	123		126	130	131.5	21% KOH	134.5					
5877	63.7	Put in 13% NaOH + 75 g. SiOH.	82	90		95	95	95	—	97.5					
	Given 25 Commercial Runs	Present Electrolyte					Added 10 g. SiOH to #14106. Given 25 Com. Runs.								
14106		21% KOH + 10 g. SiOH	103	104	105	103		90	91.5	93.5	91.5	92			
14615		" " 20 g. "	133.5	139	142	143		116.5	122.5	124	123.5	122.5			
14626		21% KOH —	143	149	152.5	152		124	131.5	134	131.5	134			
14640		" " —	132.5	139.5	142.5	142		117.5	123	123.5	125	123.5			
14642		21% KOH + 50 g. SiOH	142	148.5	154	152.5		122.5	132	133	135	134.5			
2707		21% KOH + 20 g. SiOH	89	89.5	94	Put in Fresh 21% KOH.	97.2	88	88.5	} C.O.					
5644		21% KOH —	124.5	131	136		137.5	131	132						
5877		13% NaOH + 75 g. SiOH	74	76	78		80.2	86	80						

See 8/17/07

5/9/07.

Low Capacity Tube Cells for Special Treatment.

	#383	680	Put in 21% KOH + 2 g. SiOH.	652	598	560	Now in hot bath at temp. of 145°F.	775	770	727	Now running normal again	640	612	607		
	384	592		555	515	478		720	702	675		517	511	537		
	385	702		690	632	591		802	800	742		667	647	642		
	480	717	Put in 15% NaOH + 2 g. SiOH.	677	703	650										
	481	570		495	502	507										
Bad Fe	484½	747														
	485	513														
	486	665														
	487	700	Same as 480 + 481.	653	655	618										
	488	610		500	525	500										
	649	577	Put in 21% KOH saturated with SiOH	292	262	257	Now hot at temp. of 130°F.	420	387	367	Now normal again	297	295	Put in reg. KOH 21%	342	375 } *
	650	530		255	255	242		400	375	370		303	296		385	415
	651	425		315	290	277		440	400	400		313	300		387	420
	658	695	Set soak 3 days in 21% KOH saturated with SiOH, at temp. of 135°F. Then put in 21% KOH	680	705	700	} *									
	659	725		713	730	730										
	660	695		680	705	702										
	2455	577	Put in 21% KOH + 2 g. SiOH.	518	493	445	Now in hot bath at temp. of 145°F.	637	615	641	Now running normal again	452	425	427 } *		
	2456	521		420	387	306		456	430	435		300	252	252		
	2457	257		175	137	92		152	200	120		75	76	80		
	2458	475	Put in 15% KOH saturated with SiOH	390	397	367	385	Now in hot bath at temp. of 145°F.	650	538	Now normal again	407	390	Put in reg. KOH 21%	303	306
	2459	396		346	367	322	305		585	493		337	352		253	281
	2460	425		346	363	338	300		500	425		300	300		252	280
	2461	430	Fill with 15% KOH saturated with SiOH. Set soak for 3 days at temp. of 190°F; then put in 21% KOH and run reg.	337	293	275										
	2462	392		305	295	276										
	2463	480		425	410	405										

* Tubes* 649-651, 658-660, + 2455-2457 given reverse treatment. See results further on in this book.

5/9/07

Good Irons.

Capacity and Efficiency before Reversing.

	Grams	Cap. on Overcharge	Cap. on Eff. Charge	Efficiencies		
				Volt	Amp-Hour	Watt-Hour
3591	3.5	1465	887	75.6	84.5	63.9
92	"	1340	892	75.2	85	63.9
3607	"	1570	952	75	907	68.1
08	"	1495	955	75.8	91	68.9
09	4	1600	1050	76.2	87.5	66.7
10	"	1650	1080	75.4	90	67.8
3659	5	1637	1285	75.8	85.6	64.9
x 60	"	1575	1275	75.8	85	64.4
3699	4	1425	1037	76.2	86.4	65.9
3700	"	1482	1040	75.9	86.6	65.7
3725	5	1645	1320	75.5	88	66.4
26	"	1542	1275	75.3	85	64
27	"	1500	1277	74.6	85.1	63.5
28	"	1617	1310	76.3	87.3	66.6
3745	"	1780	1237	73.4	82.5	60.6
46	"	1790	1225	73.9	81.6	60.2

Capacity and Efficiency after being reversed, against strips on hot test, 48 hrs. @ 400 m-a.

	Grams	Cap. on Overcharge	Cap. on Eff. Charge	Efficiencies		
				Volt	Amp-Hour	Watt-Hour
3591	3.5	1350	850	75.3	80.9	60.9
92	"	1300	830	74.6	79	58.9
3607	"	1595	885	74.6	84.4	62.9
08	"	1590	865	75.4	82.4	62.1
09	4	1530	976	75.8	81.3	61.6
10	"	1585	1000	75.4	83.3	62.8
3659	5	1745	1285	74.8	85.6	64.1
60	"	1700	1215	75.5	81	61.1
3699	4	1315	975	75.1	81.3	61
3700	"	1400	1010	75.1	84.1	63.2
3725	5	1495	1265	75	84.3	63.3
26	"	1375	1207	74.5	80.5	60
27	"	1350	1207	74.4	80.5	59.9
28	"	1315	1220	75.6	81.3	61.4
3745	"	1035	1285	72.1	85.6	61.7
46	"	1330	1265	73.3	84.3	61.8

5/11/07.

Tubes, Set #5. SiOH Solutions.
Average P.D. of Charge and Discharge on 5 hr. chg. @ 200 m-a.
approximated from Curves.

CELL	ELECTROLY[illegible]	CHARGE	[illegible]CHARGE
5992	21% KOH + 2g [illegible]OH (175cc)	1.737	[illegible]5
93	" " "	1.73	1.26
94	" " "	1.727	1.26
5995	17% KOH "	1.745	1.26
96	" " "	1.745	1.26
97	" " "	1.745	1.26
5998	13% KOH "	1.76	1.25
99	" " "	1.76	1.25
6000	" " "	1.76	1.252
6001	21% NaOH + 2g. SiOH.	1.76	1.215
02	" " "	1.767	1.205
03	" " "	1.765	1.21
6004	17% " "	1.755	1.237
05	" " "	1.757	1.23
06	" " "	1.755	1.232
6007	13% " "	1.755	1.245
08	" " "	1.755	1.245
09	" " "	1.755	1.245

5/22/07.

Low Capacity E27 Cells.

Special Treatment:

First 3 runs, in old electrolyte, sp. gr. of which was | E27 * 7374 – 1160
" 7424 – 1155

	1	2	3	Fresh 21% KOH [illegible] Cells –	4		5		6	7	8	9
*7374	52.5	41.2	41.2	after 4th [illegible]rge	75.7		90.7	Added 45 g. LiOH	109.5	109.5	114	111.3
7424	53.2	41.2	45	" 3rd discharge	86.2		85.5	" " "	103.5	101.2	106.1	102

	Both cells fully	10	11	12
7374	chg'd + S.C. in series	117	113.2	111
7424	Solution not changed	110.2	105.7	102.7

5/23/07.

Sow Capacity E18 Cells.

Fresh KOH put in and a run made by Sadler before receiving.

	Sp.Gr.	1	2	3		4	5	6	7	8	9		35	36
7837	1190	53	57	57	Add 50 g. SiOH + soak 3 days at 130° F. – Then put in 21% KOH.	66	68	70	70.5	71	72	25 Commercial Runs.	77	75.5
7839	1194	46	47	47.2	Add 25 g. Si_2CO_3 + run reg.	69.2	71.5	71.5	71	71.5	72.5		79	76
11475	1205	51	53	52	Fill with 9% KOH + 25 g.	77	77.5	82	83.7	82	84		81	84
11497	1200	46.5	47	46.5	SiOH and " " + 50 g.	71	77.5	83.2	85	87.5	88.5		88	92
11506	1219	47.5	52	51	15% KOH + 25 g. SiOH	63	70	72.5	72.5	73.5	76.5		72	75
11514	1210	38.5	39.5	40.5	" " + 50 g. "	68	75	81	81.5	83	84		80	86.2
11633	1194	44	47	46.5	21% KOH + 25 g. SiOH	64.5	69.5	72.5	71.2	72.5	72.5		68.5	72.5
11643	1212	27	29	27	" " + 50 g. "	52.5	60.2	68	68.5	71.5	73.5		74	79
11699	1185	42	48	48	27% KOH + 25 g. SiOH	74	78.5	84	82.5	81	82		83.5	81.5
11751	1177	41.5	46.5	47.5	" " + 50 g. "	72.5	76.5	80.5	80.5	82.5	85		82.5	88

11

	37	38		63	64	65		91		92	93		144	145	146	147		
7837	77.5	77	25 Commercial Runs.	74.5	76	75.7	25 Commercial Runs	76.		78.5	78.5	50 Commercial Runs —	74	75.2	77.5	76.5		Continued further on in book under 10/21/07.
7839	78.5	77		74.5	76.5	76.5		77.		79	80		74.5	76.5	78	78		
11475	83	85		91.2	94.7	95.5		97.		99	100		98	101.7	103.2	104.2		
11497	92	93		102.7	104.2	104.7		108.5		109.5	108.5		108.5	109	113.5	112.5		
11506	72.5	73		81	83.7	83.5		84.		87.5	87		S.C.	—	—	—		
11514	87	89		81.5	87.5	89		88.		92	92		86	91.5	91.5	93.5		
11633	72	71.5		67.5	69.2	69.2		68.		68.5	70		69.5	67.2	68	69		
11643	79	82		76	81.2	82.7		83.5		87	88		84.5	87	88.5	90		
11699	77.5	77		72	74.7	74.5		75.		78.5	79		72	74.5	75.2	76.7		
11751	90	89		80	87	88.5		86.5		90.5	91		84.7	89	90.5	92.5		

Data on 3" Tube. – Average of Tubes #5601 – 03.

Total Capacity 1170 m-a-h

Charge 5 hrs. @ 200 m-a.
Discharge @ 150 m-a.

Milampere-Hour Input	1000
" " Output	768
Average P.D. of Charge (assumed)	1.72
" Discharge "	1.25
Ampere-Hour Efficiency	76.8 o/o
Watt-Hour "	55.8 o/o

Charge 6 hrs. @ 200 m-a.
Discharge @ 150 m-a.

Milampere-Hour Input	1200
" " Output	862
Average P.D. of Charge (assumed)	1.72
" Discharge "	1.25
Ampere-Hour Efficiency	71.8 o/o
Watt-Hour "	52.2 o/o

Preliminary Calculations of 4.1 inch Tube.
From 5601-03. Made according to Length.

Total Capacity	1600 m-a-h

Charge 5 hrs. @ 273.3 m-a
Discharge @ 205 "

Milampere-Hour Input	1366
" " Output	1049
Av. P.D. of Charge (assumed)	1.72
" Discharge "	1.25
Ampere-Hour Efficiency	76.8 o/o
Watt-Hour "	55.8 o/o

Charge 6 hrs. @ 273.3 m-a.
Discharge @ 205 m-a.

Milampere-Hour Input	1640
" " Output	1178
Av. P.D. of Charge (assumed)	1.72
" Discharge "	1.25
Ampere-Hour Efficiency	71.8 o/o
Watt-Hour "	52.2 o/o

Preliminary Calculations of Nine Plate Tube Cell.
Containing 120 4.1" Tubes.

Total Capacity	192 A-H.
Charge 5 hrs. @ 32.8 amps.	
Discharge @ 24.6 amps.	
Ampere-Hour Input	164
" " Output	126
Watt-Hour "	157
Av. P.D. of Charge (assumed)	1.72
" Discharge "	1.25
Ampere-Hour Efficiency	76.8 o/o
Watt-Hour "	55.8 o/o
Weight of Cell (assumed)	~~12~~ lbs.
Watt-Hours per Pound	~~13~~
" " available by long Charging	~~20~~

Charge 6 hrs. @ 32.8 amps.	
Discharge @ 24.6 amps.	
Ampere-Hour Input	197
" " Output	141
Watt-Hour "	176.6
Av. P.D. of Charge (assumed)	1.72
" Discharge "	1.25
Ampere-Hour Efficiency	71.8 o/o
Watt-Hour "	52.2 o/o
Weight of Cell (assumed)	~~12~~ lbs.
Watt-Hours per Pound	~~14.7~~
" " " available by long Charging	~~20~~

Data on 3" Tube in Special Electrolytes.

Electrolyte = 21 % KOH containing 2 g. SiOH to cell of 175 cc.
Average of Tubes # 5992-94

Total Capacity	1155 m-a-h
Charge 6 hrs. @ 200 m-a.	
Discharge @ 150 m-a	
Milampere-Hour Input	1200
" " Output	900
Av. P.D. of Charge	1.73
" Discharge	1.24
Ampere-Hour Efficiency	75 %
Watt-Hour "	53.7 %

Electrolyte = 13 % NaOH containing 2 g. SiOH to cell of 175 cc.
Average of Tubes # 6007-09.

Total Capacity	1132 m-a-h
Charge 6 hrs. @ 200 m-a.	
Discharge @ 150 "	
Milampere-Hour Input	1200
" " Output	942
Av. P.D. of Charge	1.75
" Discharge	1.22
Ampere-Hour Efficiency	78.5 %
Watt-Hour "	54.7 %

6/4/07.

Reverse Treatment of Old Tubes

These Tubes were previously treated with SiOH with no beneficial result. See under date of 5/9/07. First run here given is the la[illegible] run after the Si[illegible]H treatment.

								8/12/07.						✓
649	21% KOH	375	Reversed 20 hrs. @ 300 – Solution not changed	487	500	500		Reversed 48 hrs @ 300 m-a in 21% KOH + 2 g. SiOH. Then changed solution to reg. 21% KOH.	620	635	650	658	662	667
650	"	415		525	533	528			690	681	690	695	697	706
651	"	420		580	587	532			737	730	742	755	758	770
658	"	700		800	786	792		Reversed 48 hrs. @ 300 m-a in 15% KOH saturated with SiOH. Then changed solution to reg. 21% KOH.	795	807	805	820	822	818
659	"	730		820	815	812			885	878	871	885	880	877
660	"	702		755	760	765			730	740	737	748	743	750
2455	21% KOH + 2 g. SiOH	427		405	400	408								
2456	"	252		240	235	220								
2457	"	80		52	75	70								

		✓
649	670	663
650	700	691
651	767	760
658	815	805
659	875	865
660	742	735

6/5/07.

Low Capacity E18 Cells.

Endurance of cells which were brought up by changing the KOH and running on a long charge.
All these are said to have run less than 50 amp-hrs. on commercial chg.

#4233	Filled Cells with Fresh 21% KOH	123	135	126.5	25 Commercial Runs by Sadler	105.5	105.5	107
6922		32	67	130.2		97.5	104	103.5
7035		40.5	83.5	147		107.7	113	114
7181		110	157	151		103.5	106.5	107.5
10455		129	123	122.5		Short Circuit		
10684		133.5	142.5	137		119	123	124
12337		76.5	133	137.5		121.5	128	129.5
12354		118	153.5	143		126.7	133.5	133.5
12382		82	139	141.5		132	138.5	142
12402		121.5	140	133		115.5	120	120.5

6/11/07

Regular Tubes in Different Electrolytes.
Capacity at Normal Temp + @ 130° F.

	Electrolyte	Capacity on Overchg.	At 130° F.		Cap. on Overchg. after the 5 hot runs. (3rd run after)
			Cap. on Overchg. (3rd run)	Cap. on 5 hr. Chg. @ 200 m-a. (2nd run)	
591 A	15% $NaOH$ + 2g. $SiOH$.	1180	920	625	1175
" B	21% KOH + " "	1147	767	502	1160
" C	" " saturated w. $SiOH$	1050	1025	760	1113
592 A	21% KOH.	1133	666	385	1087
" B	" "	1165	672	382	1112
" C	15% $NaOH$.	—	832	507	1127

6/11/07.

Regular 3" Tubes in 21 %. KOH. Temperature Effect.

		Chg'd 5 hrs. @ 200 Dischg'd @ 150.	Chg'd 2½ hrs. @ 400 Dischg'd @ 150.
5414	Charged and Discharged at Normal Temperature	750	587
5972		790	600
5413	Charged at 130° F. Discharged Normal Temp.	350	452
5971		335	402

6/27/07.

*594 Fe in Magnetic Field.
One 5 g. Reg. Fe / Four Tubes.
Chg'd 15 hrs. @ 400 – Dischg'd @ 300.

RUN*	To 1 V.	
8	1667	Regular
9	1530	"
10	1620	"
11	1885	In Magnetic Field on Discharge.
12	1675	Regular
13	1885	In Magnetic Field on Discharge
14	1900	" " "
15	1700	Regular
16	1525	"
17	1700	"
18	1730	"
19	1900	In Magnetic Field on Discharge
20	1930	" " "
21	1895	" " "
22	1960.	" " "
23	1975	Same but Polarity of Magnet Revers

Found that magnet heated up when current was on and cell was heated by magnet. Temp. in cell after 23rd run was 104° F.

7/8/07.

Results of Tests made on Tube Cells for Mr. Kammerhoff.

	Total Number of Previous Runs	Chg'd. 15 hrs. @ 300. Discharged @ 200	Ditto	Ditto	Ditto	Ditto.		Chg'd 6 hrs. @ 200. Disch'g'd @ 200	Ditto	Chg'd 5 hrs. @ 240. Disch'g'd @ 200.	Ditto	Ditto	Chg'd. 5 hrs. @ 240. Disch'g'd @ 250.	Ditto	Chg'd 4 hrs. @ 300. Disch'g'd @ 200.	Ditto
5000	243			966	1000	1000	21 % KOH	703	703	623	786	646	645	633	663	603
01	"			961	993	990		713	703	626	793	660	654	645	666	605
02	"			990	1016	1006		733	710	653	813	676	662	654	680	620
5849	113			1283	1231	1220	25 % KOH + 2 g. SiOH	930	900	820	1016	916	850	879	906	846
50	"			1316	1256	1230		960	913	856	1036	933	858	879	926	866
51	"			1356	1256	1233		960	970	863	1053	950	879	891	943	900
5855	113			800	1160	1143	21 % KOH + 2 g. SiOH.	896	860	898	966	840	783	804	833	796
56	"			1178	1161	1133		898	873	778	980	863	796	812	870	800
57	"			1178	1163	1133		920	890	800	986	886	820	829	876	816
6705	None	825	946	983	990	991	21 % KOH	793	760	713	856	743	712	704	700	660
06	"	796	925	956	963	963		760	740	686	820	713	683	675	693	630
07	"	803	926	963	965	966		763	748	693	850	720	695	695	700	656
6708	"	853	984	1030	1026	1028	21 % KOH + 2 g. SiOH.	823	800	743	896	780	760	762	773	726
09	"	820	961	1020	1023	1026		825	798	720	883	773	737	754	748	713
10	"	861	983	1031	1031	1030		843	820	743	916	806	782	783	793	743
6711	"	846	1000	1043	1030	1025	27 % KOH + 2 g. SiOH.	833	796	746	900	800	762	775	810	763
12	"	873	1016	1063	1046	1040		838	800	746	900	800	770	782	816	763
13	"	860	1001	1046	1030	1020		826	800	730	890	790	754	766	803	743

7/11/07.

Old Tubes Tested for Efficiency

Charged 5 hrs. @ 200 m-a.
Discharged @ 150 m-a.

*761	733	728
762	713	713
763	752	750

These cells have had a total of 835 "cold" runs.

The capacity on overcharge was -

	7th Run	835th Run
*761	960	823
762	877	925
763	947	887

Charged 5 hrs. @ 200 m-a.
Discharged @ 150 m-a.

*1575	603	575	570
1576	616	580	580
1577	645	590	595

These cells have had 550 hot and 52 "cold" runs.

The capacity on overcharge was -

	7th Run	602nd Run
1575	922	830
1576	892	850
1577	907	780

7/12/07.

Hot Endurance Test of Efficient Fes.

	Grams Mix	Cap. on Overload	A-H Efficiency on 3rd Eff. Run		Cap. on Overload	Ditto	Ditto	Ditto	Efficiency Runs. Chg'd 300 m-a-h per gram at 300 m-a Rate Run 69	70	71	72	73	A-H Efficiency on 73rd Run.
3823	4.5	1860	89.2	50 Runs on Hot Test. Changed KOH.	1130	1300	1350	1357	1155	1100	980	900	875	64.8
24	"	1870	88.9		1230	1480	1535	1520	1242	1192	1115	1000	980	72.6
3825	"	1725	93.7		932	1090	1100	1125	1120	1020	930	810	830	61.4
26	"	1725	91.3		600	812	900	930	875	917	900	820	850	62.9
3857	"	1775	87.4		1200	1500	1542	1525	1032	900	850	820	865	64.1
58	"	1760	87		1230	1530	1590	1560	1282	1235	1170	1135	1087	80.4
3867	"	1650	87		1230	1392	1500	1537	1250	1197	1170	1135	1090	80.7
68	"	1530	87.1		1020	1320	1380	1375	1012	910	890	660	740	54.8
3869	"	1505	90.4		1180	1400	1480	1477	1285	1222	1180	1130	1092	80.9
70	"	1550	90		1000	1315	1390	1420	1287	1250	1150	1040	1017	75.3
3877	5.5	1705	88.1		1400	1815	1880	1870	1400	1270	1267	1260	1227	74.3
78	"	1515	83.3		1215	1540	1660	1672	1307	1262	1160	1185	1140	69.1
3885	4	1575	88.7		1210	1562	1625	1597	1122	1100	1060	1040	1010	84.1
86	"	1627	88.5		1222	1560	1550	1557	1132	1060	980	945	900	75

7/25/07.

Note. Fes stood in KOH one month after the treatments before they were run.

Regular Mix, 5 g. Fes after Special Treatment.

		Charged 15 hours at 400 m-a.											Chg'd 5 hrs. @ 300.					
		Run @ 300			Run @ 750			Run @ 300.					Run @ 300.					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		A-H Eff.
596	A	1430	1480	1200	987	1100	1175	1640	1462	1580	1560	1587	1230	1217	1160	1190	[illegible]	79.3 %
"	B	1517	1500	1235	975	1112	1168	1645	1500	1580	1577	1587	1232	1222	1172	1225	20247	81.6
597	A	960	1200	820	725	1012	1056	1500	1450	1500	1507	1530	1212	1180	1115	1150	17917	76.6
"	B	1062	1365	775	668	1000	1050	1540	1415	1600	1572	1592	1210	1225	1180	1227		81.8
598	A	1100	1310	1065	956	1150	1250	1630	1490	1600	1600	1625	1255	1227	1180	1250		83.3
"	B	1080	1265	1080	975	1150	1193	1610	1525	1550	1560	1585	1200	1180	1120	1195		79.6
599	A	1080	1470	1135	962	1150	1237	1700	1500	1625	1622	1650	1220	1200	1165	1220		81.3
"	B	1135	1432	1050	850	1075	1200	1645	1457	1625	1592	1625	1200	1205	1170	1200		80
600	A	1272	1520	1187	975	1187	1300	1715	1680	1640	1627	1625	1230	1215	1177	1230		82
"	B	1250	1500	1177	975	1100	1218	1675	1477	1600	1587	1625	1230	1215	1185	1230		82
601	A	785	860	900	825	981	1081	1500	1430	1500	1530	1562	1230	1185	1122	1155		77
"	B	990	1272	1000	850	1006	1131	1540	1425	1550	1540	1577	1245	1210	1175	1205		80.3
602	A	1100	1470	1175	1068	1187	1243	1700	1500	1640	1630	1650	1262	1230	1197	1240		82.6
"	B	1150	1500	1265	1081	1193	1300	1735	1532	1650	1637	1650	1255	1260	1207	1245		83
603	A	1300	1500	1060	925	1068	1193	1625	1450	1565	1562	1595	1260	1230	1190	1240		82.6
"	B	1300	1500	1070	829	1018	1125	1610	1442	1570	1562	1585	1255	1245	1177	1235		82.3
604	A	1277	1240	940	854	1075	1156	1560	1440	1515	1560	1590	1200	1185	1140	1185		79
"	B	1320	1267	800	775	987	1162	1622	1460	1600	1580	1615	1235	1210	1125	1170		78
605	A	1327	1300	515	650	968	1150	1535	1415	1560	1582	1615	1250	1240	1195	1235		82.3
"	B	1300	1182	680	712	975	1125	1532	1400	1530	1550	1605	1230	1240	1187	1210		80.6

Runs #3 and #8 were made on Mondays after standing.

7/29/07.

Fes from Tube Cell #2826.

	2826 A		2826 B		
	M.A.H.	A-H EFF.	M.A.H.	A-H EFF.	
Run #6	1850	—	1815	—	Chg'd 15 hrs. @ 400.
" 7	1515	101	1375	91.6	Chg'd 5 hrs. @ 300.
" 8	1335	89	1305	87	" "
" 9	1112	74	1170	78	" "
" 10	1135	75.6	1150	76.6	" "

8/9/07.

R.A. Fe Mix #1029 A. Special Treatment. 5 gram Pockets.
M.A.H. to 1V. after 15 Hours Charge at 400 m-a.

	Preliminary Treatment.	Run @ 300			Run @ 750			Run @ 300				✓
		1.	2	3	4	5	6	7	8	9	10	11
596 C	Regular - No Treatment	1620	1880	1665	1275	1262	1268	1657	1610	1675	1680	1640
" D		1582	1870	1647	1281	1268	1250	1630	1585	1630	1665	1635
597 C	Charged 15 hrs. @ 400 m-a.	1477	1787	1590	1212	1187	1187	1577	1535	1615	1625	1600
" D	at 130° F.	1500	1830	1465	1293	1281	1287	1635	1600	1635	1670	1622
598 C	Reversed 15 hrs. @ 400 m-a.	1532	1825	1620	1275	1250	1231	1615	1560	1620	1637	1600
" D	at 130° F.	1487	1800	1632	1300	1281	1287	1635	1597	1637	1645	1620
599 C	Charged and Reversed	1550	1780	1600	1287	1262	1275	1600	1550	1600	1647	1615
" D	Both at 130° F.	1608	1835	1625	1281	1237	1250	1630	1562	1627	1652	1625
600 C	Two Charges and Two	1462	1715	1590	1200	1181	1200	1600	1542	1620	1660	1630
" D	Reverses at 130° F.	1470	1697	1560	1250	1206	1250	1607	1540	1600	1650	1590
601 C	Charged and Reversed	1155	1435	1400	1181	1156	1162	1525	1485	1572	1590	1425
" D	at 200° F.	1000	1312	1330	1168	1143	1143	1522	1480	1542	1592	1537
602 C	Charged and Reversed	1648	1790	1617	1250	1237	1250	1610	1580	1590	1645	1600
" D	at 130° F. in 33 o/o KOH.	1632	1797	1612	1268	1231	1250	1595	1540	1615	1637	1587
603 C	Charged and Reversed	1465	1755	1587	1293	1262	1225	1562	1500	1600	1652	1600
" D	at 130° F. in 21 o/o KOH + SiOH.	1500	1772	1580	1218	1193	1193	1597	1537	1600	1660	1615
604 C	Cell Fully Charged and	1775	1937	1745	1387	1362	1331	1762	1660	1710	1700	1670
" D	Short-Circuited, 3 Times.	1755	1912	1690	1262	1212	1187	1670	1620	1670	1670	1640
605 C	Fully Charged and Allowed	1587	1795	1565	1200	1181	1175	1610	1535	1610	1647	1590
" D	to Self-Heat - 3 Times.	1642	1860	1615	1250	1231	1225	1627	1580	1622	1670	1600
D												

R.A. Fe Mix #1029 A Special Treatment. 5 grain Pockets.
M.A.H. to 1V after 5 Hour charge @ 300 M.A.

Chg. 5 hrs. @ 300. Run @ 300.

	12	13	14	15	16	17	Volt Eff.	A.H. Eff.	W.H. Eff.
596C	1327	1262	1240	1200	1240	1235		82.3	
" D	1320	1250	1230	1200	1222	1220		81.3	
597C	1275	1210	1172	1125	1157	1150		76.6	
" D	1317	1250	1222	1200	1230	1227		81.8	
598C	1300	1237	1200	1177	1217	1212		80.8	
" D	1320	1232	1230	1212	1230	1227		81.8	
599C	1320	1250	1225	1187	1230	1225		81.6	
" D	1322	1250	1205	1175	1222	1215		81	
600C	1332	1235	1215	1172	1225	1220		81.3	
" D	1332	1250	1212	1145	1210	1200		80	
601C	1117	1070	1057	1020	1100	1090		72.6	
" D	1262	1200	1150	1110	1127	1125		75	
602C	1332	1250	1230	1190	1237	1232		82.1	
" D	1335	1275	1240	1200	1230	1230		82	
603C	1325	1237	1220	1180	1207	1200		80	
" D	1300	1237	1180	1150	1167	1165		77.6	
604C	1350	1280	1270	1230	1275	1270		84.6	
" D	1300	1237	1235	1195	1232	1230		82	
605C	1267	1200	1160	1120	1150	1140		76	
" D	1285	1210	1175	1125	1157	1150		76.6	

8/17/07.

Lithium Treatment of Low Capacity E18 Cells. (Cont'd from Front of Book - 5/9.)

Cells given several runs after each treatment and each set of endurance runs, until results became constant. Last run only in each case is given.

	3		8		13		42		72		100		101	102
14106	77	Added 10g. SiOH	92	Run Hot Twice	102	25 Endurance Runs	103	Put 10g. more SiOH in 14106 25 Endurance Runs	92	25 Endurance Runs	87.5	Put in 21 % KOH.	90	89
14615	81.5	" 20 "	124	" " "	131.5		143		122.5		122		121	123.5
14626	89	" 30 "	134	Put in 21 % KOH	139		152		134		132.5		134.5	133
14640	77	" 40 "	123	" " "	130		142		123.5		122		121	123.5
14642	83	" 50 "	131	Run Hot Twice	139		152.5		134.5		135		140	139

	103		131		184		237		238		292
14106	88	25 Endurance Runs	88	50 Endurance Runs	80.5	50 Endurance Runs	71	Changed KOH	72	50 Endurance Runs	65
14615	119.5		120.7		116		106		105		95
14626	134		132.5		134.5		125		124.5		125.2
14640	120		122		115		105		108		105
14642	138		135		137		129		121.2		119.5

Jars Loaded from End.

Charged 15 hrs. @ 400 m-a. 8/30/07.

	Mix	Plunger	S.P. + Corr.	Weight	Run @ 300			Run @ 750			Run @ 300			
#1	792	15½ oz.	100 – 150	7.588	2115	2037	2170	1368	1525	1687	2270	2110	2085	2080
2	"	"	"	7.633	2140	1977	2225	1400	1500	1650	2275	2105	2080	2075
3	"	"	"	7.627	2075	1977	2180	1375	1625	1700	2277	2110	2115	2090
4	1033	15½ oz	100 – 150	7.062	2367	1865	2000	1568	1637	1700	2322	2180	2077	2115
5	"	"	"	7.124	2345	1867	2050	1450	1500	1568	2250	2100	1977	2005
6	"	"	"	7.057	2325	1720	1840	1450	1481	1562	2307	2145	1900	1940
7	1033	15½ oz.	75 – 100	7.075	2330	2240	2000	1500	1625	1750	2287	2110	2160	
8	"	"	"	7.09	2295	2200	1967	1450	1556	1750	2285	2090	2167	
9	"	"	"	7.152	2325	2135	2040	1481	1625	1762	2270	2080	2165	
10	1033	15½ oz	150 – 200	7.04	2220	2055	1840	1306	1343	1500	2060	1985	2030	
11	"	"	"	7.099	2275	1710	1375	1025	1068	1262	2040	1990	2022	
12	"	"	"	7.035	2265	2025	1870	1325	1325	1437	2030	1980	1995	
13	1033	24¾ oz	100 – 75	7.40	2405	1890	1600	1281	1293	1412	2107	1975	2010	
14	"	"	"	7.405	2275	1807	1540	1293	1325	1450	2140	2035	2080	
15	"	"	"	7.499	2350	1915	1635	1343	1400	1525	2225	2060	2105	
16	1033	24¾ oz	100 – 150	7.423	2277	1905	1780	1231	1312	1437	2082	1972	2025	
17	"	"	"	7.454	2312	1942	1820	1206	1275	1406	2100	2007	2047	
18	"	"	"	7.44	2350	1915	1787	1300	1343	1500	2100	2000	2015	
19	1033	24¾ oz	150 – 200	7.438	2210	1825	1800	1106	1143	1325	1847	1840	1827	
20	"	"	"	7.428	2187	1730	1657	1068	1075	1150	1800	1800	1787	
21	"	"	"	7.465	2300	1855	1740	1112	1125	1206	1877	1867	1840	
22	792	15½ oz	100 – 75	7.707	2005	1910	1947	1375	1437	1637	2225	2025	2052	
23	"	"	"	7.575	2005	1892	1900	1337	1400	1531	2140	1955	1980	
24	"	"	"	7.721	2005	1910	1985	1343	1406	1537	2230	2055	2080	
25	792	15½ oz	150 – 200	7.66	2150	1885	1800	1012	1025	1162	1837	1815	1992	
26	"	"	"	7.272	2130	1895	1835	1075	1125	1268	2007	1950	1935	
27	"	"	"	7.545	2100	1910	1835	1212	1250	1375	2025	1947	1950	

9/18/07.

Fes.	Cap.	A-H Eff.
*1	1650	78.6
2	1600	76.2
3	1707	81.2
4	1385	65.9
5	1307	62.2
6	1300	61.9
7	1415	67.4
8	1395	66.4
9	1380	65.7
10	1300	61.9
11	1240	59.1
12	1300	61.9
13	1255	59.7
14	1300	61.9
15	1300	61.9
16	1275	60.7
17	1300	61.9
18	1280	60.9
19	1200	57.1
20	1185	56.4
21	1200	57.1
22	1707	81.3
23	1660	79
24	1640	78.1
25	1415	67.4
26	1607	76.4
27	1650	78.6

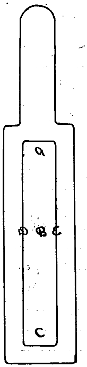
Fes loaded from end in new machine.

All charged 7 hrs. @ 300 m-a and discharged @ 300.

See previous page for data as to weights etc.

Fes	A	B	C	D	E
1	11	11	9	8	10
2	7	9	7	2	10
3	9	11	8	12	9
4	12	15	11	8	9
5	9	9	7	2	11
6	15	12	10	3	11
7	12	12	9	8	10
8	11	14	13	8	11
9	8	10	5	7	8
10	11	7	15	4	3
11	9	12	9	12	9
12	9	8	10	2	5
13	12	8	10	10	5
14	12	15	11	8	7
15	14	16	10	8	9
16	10	5	6	9	2
17	8	7	9	12	5
18	9	7	11	5	8
19	12	10	11	0	4
20	15	14	12	18	18
21	6	12	10	1	1
22	5	10	10	5	7
23	10	9	8	10	6
24	8	8	7	6	4
25	9	9	7	4	6
26	7	3	7	6	6
27	7	9	5	2	5

Swell of pocket in mils, after 8 runs.



Hot Test Fes

9/24/07.

	Grams Zinc	No. of Hot Runs	Cap. on Overchg.	Overchg. Capacity % of Original		Capacity on Efficient Chg.	A-H Efficiency	Efficiency % of Original	
3823	4.5	100	1435	79.3		990	73.6	82.5	
24	"	"	1507	80.5		1132	83.9	94.4	
25	"	"	1210	70.1		960	71.1	75.8	
26	"	"	1037	60		1085	80.4	88.1	
3857	"	"	1385	78		1110	82.2	94.1	1
58	"	"	1465	83.2		1162	86.2	99.1	
3867	"	"	1545	93.6		1225	90.7	96.9	3
68	"	"	1100	71.9		865	64.1	73.6	
69	"	"	1022	68	?	1195	88.5	97.9	?
70	"	"	1100	71		1150	85.1	94.5	
3877	5.5	"	1870	109.7		1250	75.7	86	
78	"	"	1675	110.5		1280	77.6	93.2	
3885	4	"	1565	99.4		1080	90	101.3	2
86	"	"	1500	92.3		897	74.8	84.5	
3946	"	50	1600	97.8		1060	88.3	98.5	3
47	"	"	1605	100.7		1060	88.3	104.9	
3980	"	"	1735	94		1067	88.9	103.6	2
81	"	"	1510	82.7		1070	89.1	107	
82	"	"	1517	89.1		990	82.5	99.9	4
83	"	"	1510	88.5		1130	94.1	106	
4082	5	"	1740	92.5		1355	90.3	103.6	1
83	"	"	1790	96.2		1325	88.3	101.2	
84	"	"	1700	95		1270	84.6	94.4	1a
85	"	"	1735	102		1350	90	99.7	

10/4/07.

Hot Test Fes

Capacity

Chg'd 15 hrs. @ 400
Disch'g'd @ 300

	Run #115 by Hooper	Reassembled with 4 Tubes Kept Same Solution.	Run #116	" #117	" #118	
4334	1250		1275	1830	1900	
35	1285		1300	1832	1925	
36 x	1665		1265	1615	1707	Si
4337	1240		985	1612	1720	
38	1245		992	1615	1620	
39 x	1495		950	1345	1530	Si
4340	1375		1125	1720	1872	
41	1400		1175	1837	1935	
42 x	1740		1350	1722	1815	Si

Cells marked "x" contain 21 % KOH + 3 g. Si OH. Others are regular in 21 % KOH.

Before reassembling, each Fe was running with only two tubes.

Cells stood 14 days after Run #115 before they were reassembled.

Efficiency

Chg'd 5 hrs. @ 300
Disch'g'd @ 300

	Run #119	" #120	" #121	" #122	Volt Efficiency	Amp-Hr. "	Watt-Hr. "
4334	1352	1310	1285	1292	72.8	86.1	62.6
35	1395	1335	1325	1325	73	88.3	64.4
36	1285	1252	1270	1230	71.8	82	58.9
4337	1280	1180	1145	1125	73.1	75	54.8
38	1215	1150	1135	1077	73.1	71.8	52.5
39	1205	1140	1160	1130	71.7	75.3	53.9
4340	1360	1310	1287	1235	72.6	82.3	59.8
41	1410	1335	1325	1305	72.8	87	63.4
42	1375	1325	1340	1260	71.6	84	60.1

Fes Loaded in New Machine. Charged 15 hrs. @ 400 m-a. 10/4/07.

	MIX	PLUNGER	ATM. PRESSURE	WEIGHT	Run @ 300			Run @ 750			Run @ 300			
* 28	792	8½ oz.	S.P. 100	7.349	1735	1665	1652	1312	1468	1462	2057	1935	1805	1907
29	"	"	" "	7.203	1725	1650	1625	1462	1625	1656	2150	2020	1915	1967
30	"	"	" "	7.155	1725	1617	1600	1425	1600	1625	2140	2020	1900	1950
31	"	"	Not Pressed	7.120	1605	1422	1670	1375	1575	1531	2055	1945	1835	1900
32	"	"	" "	7.340	1595	1470	1585	1412	1612	1618	2100	1980	1847	1920
33	"	"	" "	7.307	1597	1450	1650	1375	1537	1500	2047	1937	1800	1920
34	"	"	Corr. 150	7.162	1910	1755	1715	1237	1375	1456	2035	1955	1827	1925
35	"	"	" "	7.205	1900	1740	1675	1162	1275	1343	1950	1922	1775	1900
36	"	"	" "	7.205	1915	1745	1677	1150	1250	1325	1930	1920	1770	1885
37	"	10½ oz.	Not Pressed	7.590	1672	1615	1592	1456	1625	1612	2097	1982	1885	1950
38	"	"	" "	7.365	1600	1440	1655	1400	1600	1606	2060	1925	1822	1907
39	"	"	" "	7.415	1685	1530	1570	1400	1550	1487	2100	1960	1887	1935
40	"	"	S.P. 100	7.425	S.C.	1745	1425	1200	1306	1318	2015	1927	1765	1862
41	"	"	" "	7.490	1715	1660	1615	1487	1625	1612	2135	2020	1930	1975
42	"	"	" "	7.570	1750	1625	1595	1431	1606	1600	2167	2020	1900	1970
43	"	"	Corr. 150	7.530	1925	1750	1730	1231	1350	1425	2015	1965	1840	1940
44	"	"	" "	7.293	1932	1780	1750	1225	1356	1443	2060	1990	1880	1975
45	"	"	" "	7.580	1905	1740	1730	1168	1300	1350	2050	1972	1875	1960
46	"	12½ oz.	Not Pressed	7.705	1682	1595	1625	1468	1612	1612	2135	1975	1877	1940
47	"	"	" "	7.560	1680	1557	1625	1481	1612	1587	2130	1977	1880	1945
48	"	"	" "	7.660	1727	1585	S.C.	1606	1606	1581	2167	2000	1890	1960
49	"	"	S.P. 100	7.605	1780	1600	1600	1168	1306	1212	2100	1930	1775	2060
50	"	"	" "	7.538	1775	1675	1685	1525	1662	1650	2190	2035	1955	2015
51	"	"	" "	7.575	1785	1680	1735	1375	1618	1593	2225	2065	1935	2035
52	"	"	Corr. 150	7.610	2005	1915	1735	1187	1337	1450	2100	2025	1895	2065
53	"	"	" "	7.600	1975	1830	1760	1287	1462	1593	2150	2055	1930	2092
54	"	"	" "	7.638	2025	1840	1735	1200	1318	1418	2060	1992	1882	1982

10/5/07.

5 Gram Fes – #1034 Mix.

Each with 4 Tubes in 100 cc. of Solution.

Efficiency on 4th Run.
Chg'd 5 hrs @ 300. Run @ 300

Fe#	Electrolyte.	Charged 15 hrs. @ 400 milamps.											M-A-H	Efficiencies		
		Run @ 300.			Run @ 750				Run @ 300					Volt	A-H	W-H
		1	2	3	4	5	6		7	8	9	13			
626	21 % KOH	1470	1495	1675	1068	1100	1062		1695	1612	1655	1170	72.4	78	56.5
27		1460	1530	1735	1087	1162	1125		1732	1630	1655	1167	71.3	77.8	55.4
28		1472	1490	1670	906	962	962		1690	1560	1640	1165	72.5	77.6	56.2
629	21 % KOH +	1497	1492	1685	1093	1112	1087	23.9	1695	1572	1655	1195	73.2	79.6	58.3
30	2 g. SiOH	1475	1585	1760	1137	1200	1156		1740	1650	1722	1220	72.7	81.3	59.1
31		1470	1585	1750	1100	1162	1112		1740	1650	1722	1222	72.8	81.5	59.3
632	21 % KOH +	1665	1660	1815	1156	1218	1212	26.21	1735	1620	1717	1225	72.7	81.6	59.4
33	4 g. SiOH	1690	1700	1832	1137	1193	1156		1737	1642	1722	1270	72.9	84.6	61.7
34		1630	1625	1805	1137	1193	1162		1740	1620	1727	1250	72.9	83.3	60.7

10/16/07.

Special Treatment.

Low Cap. E18 Cell #7779.

Filled with fresh 21 o/o KOH and ran - charging 15 hrs. @ 40 and discharging @ 30.

Run #1 69 A-H to 1V.
2 61 "
3 59.7 "

Poured out electrolyte and filled cell with 5 o/o KOH (880 cc), to which had been added 30 g. of SiOH (gothe's)

Ran again. - charging 30 hrs. @ 20 amps. and discharging at 15 amps.

Run #4 108.5 A-H to 1V.
5 108.1 "

Soaked in H_2O followed by 5 o/o KOH. Then put in fresh 5 o/o KOH + 30 g. SiOH and ran at ~~low~~ normal rate as on first run.

Run #6 104 A-H to 1V.
" 7 — Test Spoiled.

Chg'd 30 hrs @ 20, dischg'd @ 15 amps

Run #8 123.3
" 9 126

E18 #7779 Cont'd.

Chg'd 30 hrs. @ 20 amps. - dischg'd @ 15.
Run #10 125 A-H.
Filled cell with regular 21 o/o KOH.
Run #11 122.5
" 12 121.6
" 13 122
Chg'd 15 hrs. @ 40 - dischg'd @ 30 amps
Run #14 103.5

10/21/07.

Low Capacity E18 Cells — Second Treatment.

See Previous History in front of this book under 5/23/07.
Charged 15 hours at 40 amps. — discharged at 30 amps.

	147		148	149	150		176	177		178	179	180		181	182
7837	76.5	Filled each cell with 10% KOH + 30 g. LiOH.	87.5	92	93	25 Endurance Runs	83.5	86.5	Charge Hot @ 130°F. Discharge Normal	77.5	75	71.5	Run Regular at Norm- al Temp.	82	79.7
7839	78		91.5	96	98		88	90.5		77.5	66	64		69	69.7
11475	104.2		110	113.5	115		102	102.7		93	85	80.5		91	90.7
11497	112.5		111	113.5	114.7		98	100	Charge Normal Dischg. @ 130°F.	103	103.5	103.5		90	90.5
11514	93.5		96.5	96	93		87.5	90		97.5	97	98		Reversed	120
11633	69		75.5	80.5	76		81.5	85		83	83.5	84.2		80.5	81.5
11643	90		94.5	97	95		101.7	100.5	Charge + Discharge Normal. (2 hrs stand between C + D.)	93.5	92	92.5		100	100
11699	76.7		87	88.5	87		89.5	90		83.5	83.5	83.5		91	90.5
11751	92.5		99	102	100		102	100.5		95	92	92.5		99	100

							D@15	
7837	Charge Regular – Then let stand 3 days before discharg.	16	Charge + Discharge Regular.	75	Put in Fresh 21% KOH.	78.7	93.2	C.O.
7839		50		69		74.5	94.7	C.O.
11475		71.2		86.5		95	108.7	C.O.
11497		71.5		86.5		89	107	C.O.
11514		95		107		111	117.5	Keep
11633		65		78.7		82.5	94	C.O.
11643		78.5		98.5		99.5	107.5	Keep
11699		69.2		85		89.5	101.5	C.O.
11751		77		93		95	109.5	Keep

10/22/07

Special Fes - Regular Runs

5 Gram Cakes - Oxydized Cups.

Efficiency on 4th Run.
Chg'd 5 hrs. @ 300. Run @ 300.

Fe#	Exp.	Mix	Charged 15 hours @ 400 milamps.									M.A.H.	Efficiencies		
			Run @ 300			Run @ 750			Run @ 300				Volt	A-H	W-H
			1	2	3	4	5	6	7	8	9	13			
4494	#5 S.O.	792	1225	1165	1200	887	856	900	1410	1552	1535	1122	72.1	74.8	53.9
4495	"	1034	1465	1350	1275	625	531	525	1260	1335	1412	985	69.2	65.6	45.4
4496	#9 S.O.	792	1215	1120	1155	781	775	750	1340	1450	1510	1092	70.9	72.8	51.6
4497	"	1034	1475	1505	1635	1031	931	975	1640	1657	1655	1070	72.6	71.3	51.7
4498	#10 S.O.	792	1215	1212	1240	800	806	812	1415	1515	1520	1150	72.1	76.6	55.3
4499	"	1034	1460	1475	1590	937	912	937	1590	1600	1562	1050	71.8	70	50.3

10/22/07.

Fes Loaded in New Machine.

Special Mix #1045 R.A.
All Loaded with 33½ oz. Plunger.

Fe#	Press	Weight	Charged 15 hours @ 400 m-a.														
			Run @300			Run @750			Run @300								
			1	2	3	4	5	6	7	8	9		10	11		12	13
55	Not Pressed	7.27	1550	1425	1540	1468	1418	1343	1695	1500	1425	Reversed 24 hrs. @ 400 m-a. Charged HOT.	1520	1517	Fully Charged and Short Circuited Three Times.	2640	2277
56		7.39	1640	1485	1535	1462	1468	1400	1730	1490	1425		1460	1495		2770	2310
57		7.60	1690	1525	1585	1500	1418	1250	1830	1540	1470		1465	1510		2645	2275
58	S.P. 100	7.27	1640	1395	1440	1343	1212	1150	1585	1382	1315		1350	1365		2280	1800
59		7.21	1637	1375	1420	1331	1237	1100	1600	1297	1300		1295	1325		2340	1875
60		7.17	1690	1480	1540	1500	1468	1312	1850	1537	1450		1480	1475		2785	2265
61	Corr. 150	7.18	1875	1630	1585	1125	1175	1000	1620	1340	1420		1357	1535		2130	1805
62		7.33	2090	1910	1900	1306	1356	1025	1920	1610	1635		1820	1840		2630	2120
63		7.22	1915	1740	1740	1318	1350	1125	1780	1435	1495		1425	1670		2420	2115

	14	15	
55	1970	1980	1685
56	2020	1840	1760
57	2000	1875	1790
58	1450	1460	1460
59	1547	1550	1470
60	1975	1800	1700
61	1200	1425	1425
62	1780	1785	1737
63	1807	1750	1660

10/25/07.

Sow Capacity E 18 Cells.

Runs Marked (*) Charged 15 hrs.@ 40, dischg'd @ 30. Others Charged 30 hrs @ 20, run @ 15.

	1*	2*	3	4		5	6	7		8	9		15hrs@40	10@60
5088	39	40	This Run was Spoiled.	49	2½ % KOH + 15 g. SiOH	80.7	84.5	85	Put in fresh Solutions – Same % KOH and SiOH as before.	89.5	90	Will now keep discharg. rate constant @ 15 amps and vary charg. rate.	89.2	91
5555	57.7	62.5		80.7	" " 30 g. "	96.5	97.5	96.2		95	91.2		89.2	87
8805	40.5	43.5		48.7	" " 45 g. "	101	102.3	101.7		107.2	105		101.5	102
8858	39	42.5		44.2	5 % " 15 g. "	80	78.7	77.5		88.7	91.5		88.7	85.5
10747	47	48.5		54	" " 30 g. "	87.5	87.7	87.2		90	89.7		86.7	65
12372	53	54.5		57	" " 45 g. "	119	118.7	118.7		120.5	120.2		116	115
12854	51	51		55	7½ % " 15 g. "	97.5	93.7	92.2		Rev. 15 hrs	107.3		105.2	101.7
14306	59	60.7		60.5	" " 30 g. "	98.2	99	99.5		104.7	106.2		104.2	95.7
14311	53	53.5		51.5	" " 45 g. "	94.2	93	97.2		98.5	101.6		103.2	93.7
14375	58.5	61.5		60.5	10 % " 15 g. "	89	85	86.5		90.7	95		94.7	90.7
14563	52	53.5		53.7	" " 30 g. "	98.2	95.5	98.5		102.7	106.5		106.2	87.2
15425	43	42		43.2	" " 45 g. "	91	91.7	97.2		98.7	104.5		102.5	100

		D@15	D@45	D@75	D@15	D@15	D@30		D@30	D@30	
5088	Charge Constant – 15 hrs. @ 40 amps. Discharge Rate Varied as Noted.	92.2	83.7	50	89.2	94	85	Filled all Cells with Regular 21% KOH	87	87	} Gave to Hooper
5555		90.2	74.2	60	83.2	87.5	81		81.5	80.5	
8805		102.5	70.5	58.7	89.5	94	75.5		77.5	76.5	} to Hooper
8858		95	65.6	50	91.7	96	75		79.5	75	
10747		90.5	66	47.5	74.5	78.7	73		71	75	
12372		120	87.7	73.1	111.5	119.2	97		94	93.5	
12854		113.7	88.2	72.5	109	117	104.5		101.5	99	
14306		114.5	84	56.2	104.5	111.5	104.5		106	103.2	
14311		114.5	89.2	53.7	99.5	107.7	103		103	103.5	
14375		101.5	90	67.5	96.5	102	100		97.5	99	
14563		104.2	93.7	50	107	114	107.5		108.5	108.5	
15425		109.2	74.6	55	96.2	103	85		82.2	84.2	

10/28/07.

Temperature Experiments.

3 Inch Tubes, Each Against Four Fes in 21 % KOH.

Tubes*
5413-15.

RUN	Charged Hot Disch'g'd Normal. *5413	Charged Normal Disch'g'd Hot. 5415	Ch'g'd + Disch'g'd Normal. 5414	Temperature of 5413 on Charge 5415 on Discharge. °F.
Charged 15 hrs. @ 300, discharged @ 150				
111	560	952	935	145
117	603	922	922	130
122	625	900	917	115
129	787	890	915	100
Charged 5 hrs. @ 200, discharged @ 150				
112	375	593	705	145
121	360	657	715	130
124	450	672	737	115
131	400	675	725	100

Tubes*
5971-73.

RUN	Charged Hot Disch'g'd Normal *5971	Charged Normal Disch'g'd Hot. 5973	Ch'g'd + Disch'g'd Normal. 5972	Temperature of 5971 on Charge 5973 on Discharge °F.
Charged 15 hrs. @ 300, discharged @ 150.				
32	487	1062	1065	145
38	572	1030	1062	130
43	585	1030	1062	115
50	725	1017	1065	100
Charged 5 hrs. @ 200, disch'g'd @ 150.				
33	322	550	742	145
42	325	657	737	130
45	402	692	742	115
52	500	677	730	100

10/28/07.

Standing Tests - Normal and Hot.

3" Tubes, Each against 4 Fes in 21 % KOH.

All charged 15 hrs. @ 300 m-a at normal room temperature.

Tubes # 5414-15.	Time of Standing Before Discharge	Stand + Discharge at Normal Temp.	Stand + Discharge Both at 130° F.
RUN	—	5414	5415
136	5 min.	912	885
143	1 hr.	900	847
145	2 "	885	822
147	3 "	885	832
149	12 "	845	832
150	24 "	845	767
151	3 da.	850	750
152	7 "	775	700

Tubes # 5972-73.	Time of Standing Before Discharge	Stand + Discharge at Normal Temp.	Stand + Discharge Both at 130° F.
RUN	—	5972	5973
57	5 min	1060	1030
62	1 hr.	1025	987
64	2 "	1017	953
66	3 "	1010	935
68	12 "	982	945
69	24 "	982	908
70	3 da.	965	832
71	7 "	917	820

11/12/07.

Fes Loaded in New Machine. Mix #1051.

Deep Pockets Loaded with a 14½ oz. Plunger.

Charged 15 hrs @ 400 m-a + Discharged as Noted Below.

Fe#	Press.	Weight	Run @ 300			Run @ 750			Run @ 300		
64	Not Pressed	7.53	1100	1080	1950	1675	1718	1981	2410	2412	2410
65		7.73	1515	1780	2315	1825	1825	2037	2470	2475	2482
66		7.62	1515	1700	2290	1700	1637	1850	2400	2370	2390
67	S.P. 100	7.51	2170	2350	2440	1700	1643	1850	2410	2405	2362
68		7.39	1995	2240	2380	1725	1650	1850	2415	2410	2345
69		7.69	2227	2460	2495	1700	1637	1850	2460	2440	2365
70	Corr. 150	7.49	2465	2280	2340	1200	1125	1362	2415	2292	2175
71		7.55	2480	2287	2365	1187	1081	1287	2385	2257	2187
72		7.51	2475	2660	2520	1687	1687	1750	2660	2510	2330

	Charged 7.5 hrs. @ 300 Discharged @ 300 to One Volt.				Amp.-Hour Efficiency
#64	1650	1640	1660		73.8
65	1600	1595	1630		72.4
66	1680	1640	1660		73.8
67	1695	1720	1730		76.9
68	1620	1650	1675		74.5
69	1630	1620	1640		72.9
70	1740	1690	1680		74.7
71	1730	1680	1680		74.7
72	1760	1720	1710		76

Low Capacity c̄ 18 Cells. SiOH Treatment. 11/13/07.

Charged 15 hrs. @ 40 amps. and Discharg'd @ 30, unless otherwise noted.

							D@15			D@15			
*5640	51.7	52	2½ % KOH + 60 g. SiOH	61.2	65		95	63.5	70	92.5	Given 2 runs	72.5	72
5694	51.5	54.7	" " + 75 g. "	68.5	75.7		86.7	73.7	80.5	90.7	Charging 10 hrs.	84	80
6468	56.7	62	" " + 90 g. "	74	75		85.5	70.2	75	85	@ 60 amps, and	74.5	74
7252	45.7	48	5 % KOH + 60 g. SiOH	82.5	88.7		99.7	89	92.5	102.5	Discharging @	83	79.5
7560	51.5	54	" " + 75 g. "	102.5	103.5		110.7	102.5	105	111.1	30 amps.	97	97.5
8204	44	48	" " + 90 g. "	81	77.5		93	73	74	92		75	74.5

Low Capacity E18 Cells. K$_2$CO$_3$ Treatment. 11/13/07.

Charged 15 hrs. @ 40 amps. and Disch'g'd @ 30, unless otherwise noted.

						D@15				D@15	
*12754	33.7	35.7	21% KOH + 15 g. K_2CO_3	32.5	36	35.5	+30 g. SiOH	71.7	75	82.5	Given 2 runs —
14391	53	55	" +30 g. "	54	55	57	" "	85	87	92.2	Charging 10 hrs. @ 60+
15439	45	46.5	" +45 g. "	43	43.5	48	" "	71.5	75.5	87	Discharging @ 30.

12754	83.5	80
14391	88.5	88
15439	84	80

Low Capacity E18 Cells.

Charged 15 hrs. @ 40 amps. and

					D@15
#8513	23.2	26.5	Reversed 15 hrs @	S.C.	
8821	37.2	40.5	40 amps. Then put	37.5	43.2
10702	40	43	in fresh 21% KOH.	40	46.2

8513		
8821	75.5	75
10702	86	85

Reverse + SiOH Treatment.

11/13/07.

Discharged @ 30, unless otherwise noted.

		D@15	
added 30 g. SiOH to			Given two runs —
each and Reversed	75	77.2	Charging 10 hrs. @ 60 +
15 hrs. @ 40 amps.	82.5	84.5	Discharging @ 30.

		OVERCHARGE CAPACITY.						AMPERE-HOUR EFFICIENCY.					
	Grams Mix	After 50 Hot	" 100 Hot	" 150 Hot	" 200 Hot		Original	After 50 Hot	" 100 Hot	" 150 Hot	" 200 Hot		Original
3823	4.5	1357	1435	1422	1477		1860	64.8	73.6	72.4	84.4		89.2
24	"	1520	1507	1482	1530		1870	72.6	83.9	85.4	82.4		88.9
3825	"	1125	1210	1200	1255		1725	61.4	71.1	68.5	80.4	Cupric Ferrous Sodium Sulfate 5% H_2O. S.H.	93.7
26	"	930	1037	800	1050		1725	62.9	80.4	62.2	73.7		91.3
3857	"	1525	1385	1405	1315		1775	64.1	82.2	85.2	80.4		87.4
58	"	1560	1465	1442	1380		1760	80.4	86.2	87	82.2		87
3867	"	1537	1545	1480	1740		1650	80.7	90.7	88.9	88.1	Cupric Ferrous Ammonium Sulfate 5% H_2O.	87
68	"	1375	1100	1050	1260		1530	54.8	64.1	81.4	79.7		87.1
3869	"	1477	1022	910	1125		1505	80.9	88.5	79.6	75.1		90.4
70	"	1420	1100	915	1115		1550	75.3	85.1	75.6	78.1		90
3877	5.5	1870	1870	1665	1770		1705	74.3	75.7	71.8	78.1		88.1
78	"	1672	1675	1670	1665		1516	69.1	77.6	78.8	79.3		83.3
3885	4	1597	1565	1485	1500		1575	84.1	90	80.9	92.9	Ferrous Ammonium Sulfate (Double Salt) 5% H_2O. S.H.	88.7
86	"	1557	1500	1335	1375	*Bad Jis	1627	75	74.8	69.6	*74.2		88.5
3946	"	1600	1600	1615			1635	88.3	89.6	82.5			89.6
47	"	1605	1665	1657			1592	88.3	89.7	89.6			84.1
3980	"	1735	1600	1600			1847	88.9	89.2	65	Fe 99, Bi 1, 5% H_2O. Non-Pyrophoric		85.8
81	"	1510	1575	1400			1825	89.1	87.5	90.3			83.3
3982	"	1517	1477	1217			1700	82.5	81.1	75.6			82.6
83	"	1510	1465	1320			1707	94.1	91.7	91.2			88.8
4082	5	1740	1780	1755			1880	90.3	92.6	94.8	Fe 80, W 20, 5% H_2O Non-Pyrophoric. 9#47		87.1
83	"	1790	1735	1700			1860	88.3	82	84.5			87.1
4084	"	1700	1760	1600			1790	84.6	87.3	89.6			89.6
85	"	1735	1775	1675			1700	90	91.6	91.6			90.3

11/22/07.

Pockets from Low Capacity E18 Cell #4593, (42.5 A-H.)

Taken out of the plates and slipped into small grids. Each Ni against 2 Fes in reg. 21 % KOH. Charged 15 hrs. @ 200, Run @ 100. SiOH Solution used for Treatments is 10 % KOH + 30 g. SiOH per Liter.

	1st	5th		6th	7th	gain
#638	158	190	Chg. in SiOH, Dischg. in KOH	200	205	15
639	207	232	" " " "	216	222	-10
640	142	177	Chg. in KOH, Dischg. in SiOH	187	215	38
641	146	175	" " " "	178	207	32
642	143	202	Chg. + Dischg. in SiOH.	192	193	-9
643	132	143	" " " "	161	172	29
644	155	193	C 6 hrs. @ 500 in SiOH, D in SiOH.	185	183	-10
645	182	217	" " " " "	202	197	-20
646	139	165	C 15 hrs. @ 500 in SiOH, D in SiOH.	169	173	8
647	171	203	" " " " "	208	208	5
648	192	212	Chg. 48 hrs. @ 200 in SiOH. Run reg. in KOH	256	273	61
649	185	231	" " " " " "	273	295	64
650	155	180	Rev. 48 hrs. @ 200 in SiOH. Run reg. in KOH	187	258	78
651	151	192	" " " " " "	155	205	13
652	161	188	Rev. 48 hrs. @ 200 in KOH. Run reg. in KOH	133	172	-16
653	180	217	" " " " " "	157	180	-37
654	175	208	A.C. 800 m-a, 24 hrs. T in SiOH.	250	253	45
655	127	162	" " " " KOH.	156	160	-2

12/9/07

Low Capacity Ni Pockets from Old E18 Cell #4593.
Treated with Alternating Current as below —

CELL	M.A.H.	TREATMENT		M.A.H.	
657	233	In LiOH, 1500 m-a, 48 hrs.	Run in Same Sol.	190	
658	223	" " " "	" 21% KOH	285	
646	173	" " 800 m-a, "	" Same Sol.	155	See Subsequent Treatment Below
647	208	" " " "	" " "	188	
654	208	" " " 24 hrs.	" 21% KOH	253	
655	162	" KOH " "	" " "	160	
646	155	In LiOH, 800 m-a. 24 hrs.	Run in 21% KOH	250	
647	188	" " "	" "	276	
656	195	" " "	" "	237	

1/14/08.

E 18 Cells. Endurance after SiOH Treatment.

Charged 15 hrs. @ 40 amps. — Discharged @ 30.

	2		19	Added	50 Endurance Runs		73	Added 5 g. Bi Hydrox. to cells marked x.	78		
# 12372	54.5	Given SiOH	93.5	15 g. SiOH			106		—		
12854	51	Treatment —	99	" "			84.2	x	84.5		
14306	60.7	Then Filled	103.2	" "			84.5	x	81.2		
14311	53.5	with Regular	103.5	Regular			89.7		—		
14375	61.5	21 % KOH.	99	"			90		—		
14563	53.5		108.5	"			106.2		—		

1/24/08

TUBES.

Special Electrolytes.

Results on Charging 6 hrs. @ 200 M.A
and Discharging @ .200 m-a.

CELL #	ELECTROLYTE	M.A.H. Capacity	Av. P.D. of Charge	Av. P.D. of Dischg		Efficiencies Volt	Amp-Hr.	Watt-Hr.
8701	21 % KOH.	807	1.713	1.228		71.6	67.3	48.1
02	"	827	1.711	1.232		72.1	68.9	49.6
8703	24 % KOH.	817	1.698	1.233		72.7	68.1	49.5
04	"	841	1.696	1.236		72.9	70	51
8705	27 % KOH.	793	1.692	1.236		73	66.1	48.2
06	"	795	1.687	1.232		73.1	66.3	48.4
8707	21 % KOH + 2 g. SiOH.	898	1.716	1.215		70.8	74.8	52.9
08	" "	900	1.717	1.213		70.7	75	53.1
8709	24 % KOH + 2 g. SiOH.	891	1.705	1.216		71.3	74.3	52.9
10	" "	887	1.705	1.211		71.1	73.9	52.5
8711	27 % KOH + 2 g. SiOH.	873	1.698	1.211		71.4	72.7	51.9
12	" "	881	1.702	1.203		70.7	73.5	52

1/28/08

TUBES.

Special Electrolytes.

Results on Charging 7 hrs. @ 200 M.A. and Discharging @ 200 m-a.

CELL#	ELECTROLYTE	M.A.H. Capacity	Av. P.D. of Charge	Av. P.D. of Discharge		Efficiencies		
						Volt	Amp-Hr.	Watt-Hr.
8701	21 % KOH.	867	1.731	1.225		70.8	61.9	43.8
02	"	887	1.728	1.226		70.9	63.4	44.9
8703	24 % KOH.	880	1.712	1.237		72.2	62.9	45.4
04	"	907	1.709	1.238		72.4	64.8	46.9
8705	27 % KOH.	845	1.701	1.242		73	60.4	44.1
06	"	843	1.699	1.242		73.2	60.2	44.1
8707	21 % KOH + 2 g. SiOH.	963	1.729	1.216		70.3	68.8	48.3
08	" "	970	1.733	1.215		70.1	69.3	48.5
8709	24 % KOH + 2 g. SiOH.	960	1.72	1.216		70.6	68.6	48.4
10	" "	953	1.719	1.216		70.7	68.1	48.2
8711	27 % KOH + 2 g. SiOH.	943	1.711	1.211		70.8	67.4	47.7
12	" "	951	1.712	1.208		70.5	68	47.9

1/30/08.

DATA ON "A-4" — 14 POUND CELL.

Calculated from Results on Tubes #8703-04 when New.
Electrolyte - 24 o/o KOH.
Rate of Charge and Discharge - 200 M.A. on Tube = 32 Amps. on A-4.

On Overcharge.

Ampere-Hour Capacity	189
Average P.D. of Discharge	1.235
Watt-Hour Capacity	233
Watt-Hours per Pound	16.7

On 6 Hour Charge @ 32 Amps.

Ampere-Hour Capacity	132
Watt-Hour Capacity	163
Watt-Hours per Pound	11.6
Average P.D. of Charge	1.697
" " " Discharge	1.234
Efficiency in Per Cent	
Volt	72.8
Ampere-Hour	69
Watt-Hour	50.2

On 7 Hour Charge @ 32 Amps.

Ampere-Hour Capacity	143
Watt-Hour Capacity	177
Watt-Hours per Pound	12.6
Average P.D. of Charge	1.71
" " " Discharge	1.237
Efficiency in Per Cent	
Volt	72.3
Ampere-Hour	63.8
Watt-Hour	46.1

1/30/08.

DATA ON "A-4" — 14 POUND CELL.

Calculated from Results on Tube #8709-10 when New.
Electrolyte — 24% KOH plus 2 grams SiOH.
Rate of Charge and Discharge — 200 M.A. on Tube = 32 Amps. on A-4.

On Overcharge.

Ampere-Hour Capacity	191
Average P.D. of Discharge	1.195
Watt-Hour Capacity	228
Watt-Hours per Pound	16.3

On 6 Hour Charge @ 32 Amps.

Ampere-Hour Capacity	142
Watt-Hour Capacity	172
Watt-Hours per Pound	12.3
Average P.D. of Charge	1.705
" " " Discharge	1.213
Efficiency in Per Cent	
Volt	71.2
Ampere-Hour	74.1
Watt-Hour	52.7

On 7 Hour Charge @ 32 Amps.

Ampere-Hour Capacity	153
Watt-Hour Capacity	186
Watt-Hours per Pound	13.3
Average P.D. of Charge	1.72
" " " Discharge	1.216
Efficiency in Per Cent	
Volt	70.6
Ampere-Hour	68.3
Watt-Hour	48.3

2/4/08.

TUBES.

Loss of Charge on Standing in Air.

Regular Tubes each against two Fes in 21 % KOH.

Charged 15 hrs. @ 300 m-a., Discharged @ 200 m-a.

	1	2	3	4	5 C	Treatment.	5 D	6	7
8901	975	1171	1183	1160	Charged Regular	Soaked in H_2O 24 hrs. to eliminate KOH. Then let tube dry in air 4 days.	871	1120	1113
8902	997	1185	1183	1160		Set stand in the KOH 24 hrs then took tube out and let dry in air 4 days.	900	1100	1088
8903	968	1168	1170	1147		Set stand in the KOH - 5 days.	1020	1123	1110

After 7th run, filled cells with 21 % KOH containing 2 g. LiOH to 175 cc. (See runs on following page.)

TUBES #8901-03, Continued.

Electrolyte changed to 21 % KOH + 2 g. SiOH (per 175 cc.)

	8	9	10	11	12C		12D	13	14	Changed reg.; then —	15	16	17
8901	1190	1157	1180	1177	Chg'd. Reg.	Soaked 24 hrs. in H_2O Dried in air 4 days.	938	1145	1153	Soaked 1 day in H_2O Dried in air 12 days	920	1150	1153
8902	1173	1150	1178	1183		Soaked 24 hrs. in KOH Dried in air 4 days.	756	1097	1140	Soaked 1 day in KOH Dried in air 12 days	488	980	1093
8903	1177	1150	1177	1183		Stood in KOH 5 days.	928	1120	1130	Stood in KOH 13 days	718	1087	1100

	18	19	20	21							
8901	1173	1183	1167	1193	Soaked tubes 12 hrs. in H_2O. Then dried in air two months.	933	1097	Changed solution	1233	1227	1228
8902	1147	1160	1143	1180		847	1100		1167	1192	1200
8903	1135	1150	1133	1163		0	808		1155	1207	1207

3/6/08

TUBES.

Special Electrolytes.

Charged 6 hrs. @ 200 and discharged @ 200 at different temperatures as noted.

		Charged 6 hrs. @ 200 m-a.								
CELL #	ELECTROLYTE	#47 {C @ 33°F. D @ 24°	#48 {C @ 45° D @ 47°	#49 @ 75°	#50 @ 75°	#51 {C @ 26° D @ 23°	#52 @ 75°	#53 @ 75°		
8701	21 % KOH	650	797	813	813	580	874	770	7·3	71.3
02	"	612	810	829	757	343	717	723		⑤45.7
8703	24 % KOH	602	743	787	770	600	773	747	77.3	77.9
04	"	612	757	794	787	604	850	787		74.7
8705	27 % KOH	587	698	733	720	590	772	713	81.2	81.9
06	"	577	683	720	710	573	760	697		80.6
8707	21 % KOH + 2 g. SiOH.	533	865	977	927	508	1050	927	52.1	54.8
08	" "	490	853	982	930	460	1051	932		49.4
8709	24 % KOH + 2 g. SiOH.	480	827	950	887	400	1000	873	47.6	45.1
10	" "	500	800	967	873	437	1030	907		50.1
8711	27 % KOH + 2 g. SiOH.	562	752	943	913	543	997	920	58.2	59.5
12	" "	533	765	933	908	517	980	913		57

3/9/08

TUBES

Special Electrolytes.

Loss of charge on standing.
Charged 6 hrs. @ 200 m-a.
Discharged @ 200 m-a.

CELL#	ELECTROLYTE	Discharged immediately 54	Discharged after 24 hours 55	
8701	21 % KOH	770	725	Loss = 5.9 %
02	"	740	693	" 6.4 "
8703	24 % KOH	753	676	" 10.2 "
04	"	778	703	" 9.7 "
8705	27 % KOH	713	643	" 9.9 "
06	"	705	633	" 10.3 "
8707	21 % KOH + 2 g SiOH.	930	863	Loss = 7.2 %
08	" "	933	867	" 7 "
8709	24 % KOH + 2 g. SiOH.	867	780	" 10 "
10	" "	913	850	" 6.9 "
8711	27 % KOH + 2 g. SiOH	927	853	" 8.1 "
12	" "	917	833	" 9.2 "

4/27/08.

Tube Cells #8334-36. (3" Tubes). — Bi group.

Charged 15 hrs. at 300; Discharged at 200.
Have had 162 hot, and 30 normal runs.

	193	TREATMENT.	194	195	196		197	198		199	200
#8334						Rev. 15 hrs. at 200 m-a. Solution not changed.			Rev. 24 hrs. at 300 m-a. Solution not changed.		
To 1V.	980	Fe charged against can at 100 m-a for 60 hrs.	1127	1123	1050		1253	1267		1243	1250
To .5V.	1220		1250	1223	1200		1275	1297		1267	1277
8335											
To 1V.	1173	Fe reversed against can at 200 m-a for 30 hrs.	1212	1187	1163		1228	1273		1245	1292
To .5V.	1223		1245	1221	1205		1247	1283		1253	1303
8336											
To 1V.	1185	Cell charged fully and then short-circuited.	1245	1223	1198		1323	1347		1327	1363
To .5V.	1250		1267	1253	1242		1331	1363		1338	1377

4/28/08.

Results of Some Temperature Experiments Completed May 18th, 1907.

3" Tubes, Each against 4 Fes in 21 %. KOH.
Charged and Discharged at the same Temperature.

	DATE	RUN NO.		TEMP. NORMAL.		TEMP. VARIED AS INDICATED —				
		5413-15	5971-73	5414	5972	5413	5415	5971	5973	TEMP.
Charged 15 hrs. at 300	4/30/07	93	14	950	1097	917	917	1082	1107	78°F.
Discharged at 150	4/25/07	89	10	950	1100	912	914	1080	1087	100° "
	5/6/07	97	18	947	1083	870	867	880	865	115° "
	5/13/07	103	24	925	1072	670	675	710	702	130° "
	5/16/07	106	27	932	1072	712	695	697	692	145° "
Charged 5 hrs. at 200	5/2/07	95	16	723	742	710	718	757	750	74°F.
Discharged at 150	4/26/07	90	11	725	755	651	657	655	647	100° "
	5/10/07	101	22	705	730	487	482	440	415	115° "
	5/14/07	104	25	736	740	405	385	370	360	130° "
	5/18/07	108	29	692	700	373	400	347	355	145° "

4/29/08.

FES

Low in Capacity from Running in KOH containing Bi.
Assembled each with four tubes in 21 % KOH.
Charge – 15 hrs. at 400, Discharge – at 300.

	1	2	3	4	TREATMENT	5	6	2nd TREATMENT	6	7	8°
8379 F	500	935	1100	1127	No treatment. Batt stood 2 days.	770°		Washed + dried. Soaked in Conc. $HgCl_2$ in NaCl sol. Dipped in KOH. Washed + dried.			
" FF	500	875	1000	1027		720°			917	1090	1080
8568 F	340	680	805	925	Fully chg'd. Fes rev. against cans in fresh solution – 24 hrs. Put in orig. jars + solution to run.	1067	1077	Repeated former treatment		1092	1070
" FF	325	650	770	880		1037	1040			1030	1040
8569 F	370	770	960	1020	Short-circuited after fully charging.	1240	1200	Fully charged and short circuited twice.		1500	1322
" FF	390	750	942	1022		1280	1257			1560	1300
8570 F	360	735	900	965	KOH changed after 4th discharge and again after 5th charge.	650°		Same as 8379 above, except soaked + dried in KOH first.	847	972	982
" FF	365	720	895	947		660°			845	940	980

	9																
8379 FF	1185	1350	1200	1350	1355	1450°	1400	1440	1452	1500	1500	1500°					
8568 F	1150	Charged reg. + disch'g'd at 5 amps for ½ hour.			1347	1352	1327	1300°	1300	Charged at 5 amps ½ hour. Then chg'd and disch reg.			1420	1380	1450	1445	1420°
" FF	1100				1300	1317	1295	1270°	1275				1360	1370	1380	1415	1400°
8569 F	1285	Charged reg. + short circuited 3 times.			1700	1420°	1270	1340	1365	1447	1450	1365°					
" FF	1300				1725	S.C.°	1422	1400	1410	1492	1472	1400°					
8570 F	1080	1227	1200	1330	1367	1360°	1347	—	Charged reg. Then discharged @ 10 amps for 10 min.				1640	1550	1550	1385°	
" FF	1057	1180	1185	1280	1317	1340°	1300	—					1550	1495	1500	1322°	

° – Monday Runs.

Runs continued under 5/26/08.

5/13/08

Split Badly

TUBES. - 3". (Bi)

Electrolyte - 27 % KOH + 2 g. SiOH.

Have had 150 hot runs and 28 normal runs.

	10		179	180	181		182		183	184		185	186	187
* 8460	1307	150 Hot Runs	850	849	812	Rev. 1 hr. at 200 m-a	903	Rev. 24 hrs at 200 m-a	857	766	Soaked in H_2O 3 days, then in 21 % KOH + 2g. SiOH 1 day Put in freshly 21 % KOH + SiOH to run.	833	800	801
61	1330		803	800	752		843		783	713		776	743	738
62	1287		764	770	683		850		815	716		800	773	766

		188	189	190		191	192	193		194		
8460	Reverse 24 hrs. at 200 m-a.	923	786	796	Change Solution.	790	726	748	Rev. 24 hrs at 200 m-a hot - 130°F.	870	853	
61		910	750	795		760	693	720		867	773	S.O.
62		920	766	793		783	713	733		957	850	

5/14/08.

LONG TUBES.

Have had 200 hot runs and 28 normal runs.

		4		225	226	227	229		230	231	232	233	234	235	236	237
10161	21% KOH +	1638	200 Hot Runs.	841	1020	1058	1104	Rev. 24 hrs. at 250 m.a.	1521	1488	1492	1602	1529	S.C.	1546	1542
62	3g SiOH	1654		1019	1135	1154	1250		1717	1658	1640	1708	1646	1633	1638	1658
63		1663		917	1052	1062	1133		1750	1702	1679	1731	1688	1675	1677	1704
10173	25% KOH +	1988		1029	1290	1331	1500		1621	1483	1429	1496	Changed reg. and short-circuited, twice.			
74	4g. SiOH	1971		848	1065	1079	1208		1258	1058	929	1052				
75		2021		979	1250	1291	1333		1525	1383	1279	1367				
10176	25% KOH +	1963		533	537	491	521		704	575	538	542	Soaked in H_2O + gave to T.A.E.			
77	6g. SiOH	1992		542	537	525	560		750	608	567	542				
78		2021		542	533	525	548		633	500	404	417				

10161	Tube + T co both were low, Reverse helped both. Sent back to Hooper,			
62				
63				
10173	1306	1167	1117	Badly Split
74	875	791	742	
75	1129	985	954	
10176		Badly Split		
77				
78				

10177 Test to T.A.E.

5/18/08.

Mechanically O.K.

SHORT TUBES.

Have had 250 hot and 29 normal runs.

		5		280	281	282	283		284	285	286	287	288	289	
8045	21% KOH +	1137	250 Hot Runs	810	780	786	733	Rev. 24 hrs. at 200 m-a.	1120	1067	987	973	945	953	Soaked in H_2O + gave to T.O.E.
46	2g. SiOH	1163		753	786	770	683		1028	947	838	807	780	793	
47		1127		766	748	751	703		1030	1010	943	910	887	928	
8051	21% KOH +	1093		923	857	900	827		1053	1037	980	982	950	907	Rev. 24 hrs. at 200 m-a against the can.
52	2g. SiOH	1100		807	776	800	746		1050	1027	960	933	912	927	
53		1100		817	800	823	776		1037	985	891	867	850	833	
8223	21% KOH +	1117		841	833	853	814		1110	1047	987	950	918	948	Rev. 24 hrs. at 200 m-a. Then change solution
24	2g. SiOH	1117		827	800	841	773		1140	1133	1087	1067	1047	1053	
25		1110		823	813	847	776		1167	1130	1073	1050	1013	1000	

H – means run hot (130°F.).

8045	See Treatment Above	Treated with 1% Si by T.O.E. Cleaned contacts + put up with new tips in 21% KOH + 2g SiOH.			990	840	812	790	1153 H	1183 H	1213 H	1017	1012	890	950	877	890	Continued on 6/15/08
46					1040	957	880	870	1138 H	1190 H	1227 H	1062	1067	1007	1047	1000	1012	
47					997	928	923	800	1124 H	1160 H	1180 H	980	955	878	913	860	847	
8051		980	947	1000	1012	Fill with 10% KOH +30g SiOH per l. and let stand a week. Then run regular.			780	506	550	Rev. 24 hrs at 200 m-a, against the can.		1053	Fill with 21% KOH +2g. SiOH	1020	993	933
52		933	918	953	973				700	400	400			1047		1010	973	923
53		927	833	882	913				548	360	383			1048		987	963	907
8223		1097	1073	1067	1053	Let stand a week Then run regular			1048	958	1040	Rev. 24 hrs at 200 m-a. Then put in 21% KOH straight		1210	1150	1157	1122	
24		1180	1130	1142	1133				1118	1053	1113			1208	1147	1153	1127	
25		1197	1120	1120	1120				1103	1028	1093			1212	1137	1140	1107	

5/20/08

SHORT TUBES.

Electrolyte – 21 % KOH + 2 g. SiOH + 2 g. Bi(OH)$_3$
Have had 150 hot and 58 normal runs.

	4	150 Hot Runs	208	209		210	211	212		213	214	215
8457	1177		1100	1112	Soaked in H_2O 2 days, then in 21 % KOH 1 day. Then put in fresh 21 % KOH to run.	1133	1213	1220	Reversed 24 hrs. at 200 m-a.	1160	1133	1212
58	1173		1025	1050		1193	1173	1182		1275	1257	1273
59	1173		1067	1078		1187	1187	1187		1267	1165	1257
8457	1243	1240	[illegible]									
58	1253	1264	[illegible] O.K.									
59	1253	1250	[illegible] O.K.									

5/20/08.

Mechanically O.K.

SHORT TUBE #8472.

Electrolyte – 21% KOH + 2g SiOH.

Has had 190 hot and 21 normal runs.

	5		212	213	214		215	216	217		218	219	220
8472	1220	190 Hot Runs	843	833	716	Rev. 24 hrs. at 200	1030	833	820	Chg. and S.C. 3 times	726	683	628

	221	222		223	224	225	226		227	228	229
8472	733	700	Soak in H_2O 3 days + in 10% KOH + 30g. SiOH per li, 1 day Run in 10% + 30g. SiOH	410	453	483	433	Reverse 24 hrs. at 200	973	900	902

		230	231	232		233	234	235		236	237	238	239
8472	Change sol. for 21% KOH + 2g SiOH.	933	920	860	Rev. 24 hrs at 400 m-a	1078	1020	1023	Soaked free of KOH Then rev. in saturated NaCl sol. 20 min at 200 m-a.	1082	1043	1078	1058

5/21/08

[illegible] O.K.

SHORT TUBE #8100.
Electrolyte – 21 % KOH + 2 g. SiOH
Has had 250 hot, and 38 normal runs.

	4		289	290	291	292	Charge reg. and		293	294	295	296
8100	1093	250 Hot Runs	1030	1157	1167	1138	S.C. once.		1307	1315	1283	1300

S.A.

Tube O.K.
Fe was bad + S.C. brought it up.

5/21/08.

FE CELLS.

Fes from Tube Cell
Assembled with two
Electrolyte – 21 %

#8111 – Treated by T.A.E.
new Bi tubes.
KOH + 2g. SiOH.

	1	2	3		4	5	6		7	8	9	10	11	12 ○	13
4539	342	537	550	Changed reg. +	1035	1090	1070	Chg.+S.C. twice	1150	1200	1400	1407	1300	1100	1245
40	460	700	680	S.C. three times	1185	1200	1170	at 130 °F.	1332	1372	1450	1500	1395	1200	1385

	14	15	16		17	18	19	20 ○	21	22		23	24	25 ○	26	
4539	1225	1330 1380	1210	Charge regular	1600	1360	1500	1100	1100	1265	Changed Solution	1300	1410	1500	1460	C.O.
40	1340	1460	1300	+S.C. – 3 times.	1682	1480	1600	1245	1245	1347		1400	1530	1600	1565	

5/25/08.

FE CELLS

Fes from Tube Cells # 10176 and 10178.
Each assembled with four tubes in 21 % KOH.
The electrolyte formerly was 25 % KOH + 6 g. LiOH (per 175 cc.)

		1	2	3°	4	5	6	7	8°	9	10	11	12		13	14
10176	F	1170	1130	757	985	995	1040	1120	850	952	1010	1100	1075	Charge reg. and let self-heat in air.	1050	1000
"	FF	1100	1130	722	885	970	1060	1095	855	950	1050	1100	1072		1200	1300
10178	F	1045	1125	637	870	960	1000	1020	832	875	980	1060	1052	Charge reg. Soak in H_2O 1 day. Then let self-heat in air.	1270	1115
"	FF	940	1080	720	867	920	970	1005	820	877	980	1015	980		1155	980

		15	16	17°	18	19		20	21		22	23	24	25	26°	27
10176	F	1000	1275	875	1050	1187	Change Solution	1430	1500	Charge and S.C. 3 times changing KOH after each.	1840	1613	1537	1390.	1172	1300
"	FF	1200	1400	1200	1200	1315		1515	1535		1940	1650	1587	1460	1420	1460
10178	F	1085	1280	765	937	1085		1285	1320		1767	1517	1485	1353	1100	1250
"	FF	985	1135	652	767	900		1260	1285		1690	1450	1380	1270	1127	1240

5/26/08.

FES #4547 + 48.

Fes from Tube Cell — #10177, - Treated by T.A.E.
Each assembled with two tubes. Electrolyte as below.
The electrolyte formerly was 25 % KOH + 6 g. SiOH (per 175 cc.)

	ELECTROLYTE	5 Runs by Hopkins	6	7	8	9 ⊙	10	11	12	13	14		15	16
4547	21 % KOH		570	950	970	770	930	970	1080	1070	1052	Treated with A.C. at	1185	1165
4548	" + 2 g SiOH		1000	1250	1195	1000	1070	1050	1100	1180	1080	1.5 amps. for 24 hrs.	1200	1100

	17	18	19	20 x	21	22		23	24	25 ⊙		26	27		28	29
4547	1240	1165	1265	1355	1232	1260	Change Sol.	1790	1400	1885	Reassembled	780	250	Change solution for 21 %	1550	1500
48	1260	1100	1192	1200	1075	1100	for 12 % SiOH	1870	1765	2000	with 4 tubes	650	355	KOH + 2 g SiOH	1300	1370

x = Chg'd 47 hrs. at 400.

	30 °	31
4547	1220	1550
48	1272	1475

5/26/08.

FE CELLS.

Continued. See previous runs under 4/29/08.

							⊙						⊙					
8379	FF	1507	Changed 21% KOH	1695	1672	1580	1400	1555	1515	Sol. stirred & discharged one week.	1100	1400	1200	1300	Changed 21% KOH	1417	1490	Changed Solution for 21% KOH + 2% LiOH.
8568	F	1400		1600	1600	1497	1550	1540	1400		1285	1450	1340	1330		1430	1510	
"	FF	1350		1550	1550	1455	1400	1435	1440		1285	1420	1300	1287		1450	1495	
8569	F	1360		1692	1695	1600	1515	1542	1515		1450	1540	1430	1372		1555	1590	
"	FF	1412		1630	1675	1590	1500	1577	1510		1455	1540	1457	1420		1560	1600	
8570	F	1515		1560	1660	1555	1450	1572	1510		1430	1600	1457	1460		1572	1610	
"	FF	1400		1540	1582	1525	1430	1500	1490		1350	1500	1460	1380		1572	1610	

			⊙				⊙	
8379	FF	1747	1700	1700	Change + SC – Twice.	1765	1600	1750
8568	F	1762	1770	1700		1800	1645	1690
"	FF	1770	1770	1650		1760	1600	1622
8569	F	1820	1920	1790		1860	1800	1770
"	FF	1850	1920	1795		1910	1840	1790
8570	F	1877	1880	1790		1980	1810	1800
"	FF	1880	1885	1795		1920	1770	1790

5/27/08

TUBE CELLS.

Electrolyte – 21 o/o KOH + 2 g. SiOH (per 175 cc)
Have had 250 hot and 41 normal runs.
New Fes were put in after 200 hot runs.

Mech. O.K. except #8147 which is split between runs.

	5th Run	Max. Run.		292	293	294		295	296	297	298		299	300	301
8146	1007	1383	250 Hot Runs	980	1000	997	Rev at 130° F.	990- 1363	1233	1207	1210	Charge at 130° F.	1218	1167	1137
47	1013	1460		1023	1027	1033	24 hrs. at 200	733- 1333	1200	1190	1193	24 hrs. at 200 m-a. Then charge and	1250	1177	1138
48	1013	1430		1073	1065	1063	m-a.	695- 1377	1303	1277	1277	run regular.	1327	1233	1190

	302	303	304	305	306		307	308	309	310	311		312	313	314
8146	1067	1042	980	1043	958	Reverse	1100	1043	1028	1120	1060	Reverse Ni to	1230	1108	1112
47	1073	1055	993	1037	978	24 hrs. at	1067	1045	1030	1108	1158	cap 48 hrs. at	1175	1080	1083
48	1113	1098	1030	1073	1000	200 m-a.	1057	1045	1047	1113	1077	100 m-a.	1167	1077	1080

		315	316		317	318	319	320	Condition		321	322		
8146	Changed Solution	1213	1187	Reverse	1360	1317	1307	1267	Mech. O.K.	Rev. Ni to	1370	1273		C. O. —
47		1207	1183	Ni to cap 48 hrs. at	1349	1260	1230	1190	Badly Split	cap 4 days	1293	1147		Split Badly
48		1207	1190	100 m-a hot (130° F.)	1267	1107	1060	1013	" "	at 50 m-a.	500	315		

5/27/08.

Mechanically O.K.

TUBE CELLS.

Electrolyte – 21 % KOH.
Have had 150 hot and 16 normal runs.

	5TH RUN	MAX RUN	150 Hot Runs	167	168	169		170	171	172	173	174	Changed Solution	175	176	177	178
9019	1067	1187		1120	1103	1093	Put in 21 % KOH	1193	1173	1183	1213	1213		1200	1263	1287	1330
20	1113	1233		1127	1108	1100	+ 2 % SiOH.	1209	1190	1200	1243	1248		1232	1310	1323	1360

	179	180	181	182	183		184.	185	186	187	188	189	190	191	
9019	1270	1293	1237	1290	1253	Stood a month	1413	1360	1407	1412	1407	1373	1420	1430	50 Hot Runs
20	1300	1333	1275	1333	1300	discharged	1467	1400	1437	1450	1440	1410	1458	1460	Changed Solution

	242	243	244		245	246	247		298	299	300	301	302
9019	997	1283	1260	Reassembled with	1387	1350	1367	50 Hot Runs	1287	1287	1313	1367	1350
20	1157	1380	1340	new Fes.	1420	1390	1413	Changed Solution	1333	1343	1397	1447	1430

5/27/08

TUBE CELLS.

Electrolyte – 21 % KOH + 2 g. SiOH (per 175 cc.) [illegible] O.N.

Have had 200 hot and 25 normal runs.

	5TH RUN	MAX. RUN	200 Hot Runs	226	227	228	229		230	231	232	233	234	235	
8508	1173	1353		980	943	952	973	Reverse Ni to can 24 hrs. at 200 m-a hot (130°F.)	1347	1267	1243	1287	1273	1267	Treat with A.C. at 1.5 amps for 24 hours.
09	1187	1373		1077	1000	975	977		1357	1283	1253	1267	1250	1267	

	236	237	238	239		240	241		242	243	244		245	246	247	248
8508	1267	1183	1220	1183	Change Solution for 21 % KOH	1192	1189	Rev. Ni to can 24 hrs at 200 ma	1227	1227	1217	Change solution for 21 % KOH + 2 g. SiOH	1278	1215	1233	1183
09	1283	1197	1237	1210		1200	1195		1240	1240	1221		1293	1223	1247	1200

	249		250	251	252		253	254	255	256	257	258	
							Tubes	Split					
8508	1240	Reverse Ni to can 48 hrs. at 100 m-a hot (130°F.)	1430	1247	1290	Fill with 10 % KOH + 30 g. SiOH per liter. Reverse 48 hrs. at 100 m-a hot (130°F.) Then fill with 21 % KOH + 2 g. SiOH + run reg.	1387	1310	1290	1317	1310	1310	50 Hot Runs
09	1269		1457	1267	1297		1393	1327	1310	1339	1327	1325	Changed Solution

	309	310	311		312	313	314	
8508	1117	1193	1147	Reassembled with New Fes	1150	1127	1113	C.O.
09	673	938	927		1097	1073	1063	Tubes Split

6/5/08.

FE CELLS

Fes from tube cells #7622, 7623, + 7624.
Each assembled with four tubes in 21 %. KOH ~~+ 2g. SiOH~~
Have been running with Bi tubes in 21 %. KOH + 2g. SiOH.

	1	2	3	4°	5	6		7	8		9	10	11	
7622 F	480	850	825	732	770	757	Reverse 5 hrs	785	900	Reverse	600	800	900	Change Solution
7623 F	380	585	650	572	565	555	at 1000 m-a	600	675	48 hrs. at	450	675	745	for 21 %. KOH +
7624 F	480	800	860	772	780	775		780	855	100 m-a.	550	775.	870	2g. SiOH.

	12	13°	14		15	16		17	18	19	20	21°	22		23	24
7622 F	1140	1050	1200	Change sol-	1260	1260	Change	1650	1400	1535	1500	1400	1465	Change	1347	1415
7623 F	950	785	890	ution for	1000	1062	and S.C.	1600	1300	1400	1400	1510	1455	solution for	1265	1315
7624 F	1100	1000	1150	33 %. KOH	1223	1300	3 times.	1660	1350	1495	1470	1322	1400	21 %. KOH	1322	1385

	25	26	27		28	29			
7622 F	1370	1362	1372	Change	1825	1400	1570	1500	
7623 F	1275	1150	1200	and S.C.	1767	1360	1450	1400	C.O.
7624 F	1375	1342	1360	3 times	1827	1397	1525	1490	

6/8/08

TUBE CELLS

Electrolyte – 21 g. KOH + 2 g. LiOH
Have had 300 hot and 51 normal runs.
Were assembled with new Fes after the 349th run.

	5th Run	Max. Run		352	353	354		355	356	357	358		359	360	361	362
7622	1097	1360	300 Hot Runs	1215	1158	1167	Reverse Ni to can at 1000 m-a. for 5 hrs.	1217	1133	1157	1122	Reverse Ni to can at 100 m-a. for 48 hrs.	1289	1293	1345	1310
23	1107	1320		1183	1133	1145		1227	1132	1157	1121		1317	1317	1358	1320
24	1117	1337		1189	1148	1157		1215	1120	1148	1113		1307	1300	1351	1313

	363	364	365		366	367		368	369	370	371	372	373	374	375	376	377
7622	1301	1242	1280	Change Solution	1215	1270	Reverse Ni to can at 50 m-a for 4 days.	1475	1452	1462	1460	1450	1457	1502	1475	1449	1433
23	1312	1250	1298		1213	1280		1483	1460	1472	1467	1455	1460	1510	1480	1457	1440
24	1303	1243	1277		1213	1270		1470	1457	1470	1463	1447	1453	1500	1475	1447	1433

		428	429	430		431	432	433		484	485	486	487	488
7622	50 Hot Runs Changed Solution	1320	1327	1263	Reassembled with new Fes	1293	1267	1283	50 Hot Runs Changed Solution	1280	1290	1333	1373	1357
23		1303	1333	1283		1307	1283	1303		1207	1217	1217	1247	1223
24		1233	1273	1237		1287	1263	1267		1233	1247	1267	1313	1300

6/15/08

TUBE CELLS.

Electrolyte – 21% KOH + 2g. Li OH.
These are the ones T.A.E. treated with Bi – continued from under 5/18/08.

	302		303	304	305		306	307	308	309	310		311	312	313	314	315	316
8045	890	Stood 3 days	955	933	900	Changed Solution	982	980	1151	1057	1063	Reverse Ni to car 48 hrs. at 100 m-a.	1183	1140	1263 H	1227 H	1243 H	1149 H
46	1012		1012	1007	999		1042	1031	1157	1093	1093		1184	1042	1225 H	1160 H	1167 H	1083 H
47	847		883	835	833		893	887	1014	1000	975		1053	1013	1217 H	1180 H	1197 H	1113 H

H – Means Run Hot (130°F.)

	317	318		319	320	321	322	323	324	
8045	1153	1003	Rev. Ni to car 48 hrs. at 100 m-a hot – 130°F.	1350	1277	1260	1200	1160	1120	Cut Out.
46	967	837		1253	1159	1119	1050	993	953	Tubes are Split
47	1000	890		1283	1213	1193	1140	1093	1060	

6/15/08

TUBE CELLS.

Electrolyte - 21% KOH + 2g. SiOH.
For former runs and treatments see under 5/18/08.

	300	301		302	303	304		305	306	307	308		309	310		311
8051	933	913	Refilled	426	360	366	Reversed	233	250	336	320	Changed sol-	260	213	Change Solution	177
52	923	885	with 12%	433	370	370	4. hrs. at	166	206	281	286	ution back to	213	160		147
53	907	853	SiOH.	436	356	346	200 m-a.	173	213	276	283	21% KOH + 2g Si	250	166		147

		312	313	
8051	Reverse	827	746	Cut Out
52	Ni to carry 48 hrs. at	760	626	Tubes Split.
53	100 m-a.	733	610	

6/15/08

Mach. O.K.

TUBE CELLS.

Electrolyte – 21% KOH + 2g. SiOH.

For former runs and treatments see under 5/18/08.

	295		296	297	298	299	300		301	302	303	304		305	306
8223	1040	Rev. 24 hrs. at 200 m-a.	1210	1150	1157	1122	1053	Refilled with	1190	1078	1072	1087	Soaked 21 hrs	1179	1117
24	1113	Then put in 21% KOH.	1208	1147	1153	1127	1063	21% KOH + 2g.	1197	1080	1080	1100	at 140°F. Changed	1179	1118
25	1093		1212	1137	1140	1107	1048	SiOH.	1177	1057	1059	1077	Solution.	1162	1093

	307	308		309	310	311	312	313		314	315		316	317	318
			On next run	Bad	FC										
8223	1110	1033	change cells in 12% SiOH	650	941	1033	1113	1090	Reassemble	1027	1087	Reverse	1233	1165	1120
24	1113	1047	and discharge in 21% KOH.	680	870	1062	1145	1127	with new	1050	1100	Ni to Can 4	1230	1167	1120
25	1191	1018	Then run in 21% KOH.	673	874	1030	1113	1100	changed Fe	1033	1090	days at 50 m-a	1237	1155	1110

		319	320	321	322		323	324	325	326	327	328	
						Fill with 10% KOH +30g SiOH per l. and							
8223	Rev. Ni	1233	1100	1010	993	let stand 4 weeks.	953	933	973	847	923	867	
24	to can 8	1233	1107	1020	1007	Then put in 21%	963	953	960	867	933	900	Sent Back to Hooper
25	days at 25	1240	1099	997	953	KOH + 2g. SiOH.	943	928	943	860	920	867	

6/22/08.

TUBE CELLS #8901-03.

Electrolyte — 21 % KOH + 2 g. LiOH.

These are new tubes which were used for standing tests.

	26		27	28		29	31	34		35	36	37	38	39	40	41
8901	1228	Charged	1297	1280	Charged	1277	1217	1193	Charged and S.C. 25 times.	1253	1223	1232	1177	1210	1173	1229
02	1200	and Short	1272	1258	and S.C. 3	1253	1198	1177	Solution changed after 22nd S.C.	1237	1213	1220	1172	1200	1153	1210
03	1207	Circuited	1270	1260	times.	1257	1198	1177		1250	1217	1233	1177	1210	1173	1233

7/3/08.

TUBES.

Effect of Temperature on Loss of Charge.

After a normal charge – 7 hrs. at 200 m-a – cells were allowed to stand 48 hours, first at room temperature and then at 35 °F., – after which they were discharged regularly at normal temperature.

	ELECTROLYTE	NORMAL OUTPUT	OUTPUT AFTER STANDING 48 HRS.	M-A-H LOST	LOSS IN PERCENT	
	On Standing at Room Temp.					
687 A	21 % KOH	813	727	86	10.6	10.8 % Av.
" B	"	903	807	96	10.6	
" C	"	900	800	100	11.1	
688 A	21 % KOH +	1013	867	146	14.4	15.4 % Av.
" B	2 g. SiOH	1030	870	160	15.5	
" C	"	1043	873	170	16.3	
	On Standing at Temp. of 35 °F.					
687 A	21 % KOH	787	730	57	7.24	5,8 % Av.
" B	"	853	816	37	4.34	
" C	"	857	807	50	5.83	
688 A	21 % KOH +	987	923	64	6.48	4.7 % Av.
" B	2 g. SiOH	1017	983	34	3.34	
" C	"	1032	988	44	4.26	

7/3/08

TUBE CELLS. (Long Tubes)

Electrolyte — 21% KOH + 2 g. SiOH.
Have had 254 hot and 23 normal runs.

	5TH RUN	MAX. RUN	254 Hot Runs	278	279		280	281	282		283	284	285	286	287
10120	1517			1033	1213	Reassembled	1340	1417	1342	Reverse Ni	1688	1623	1567	1596	1583
21	1529			1147	1279	with new	1425	1458	1427	to can 4 days	1733	1646	1625	1654	1633
22	1513			1063	1267	charged Fes.	1431	1456	1429	at 70 m-a.	1725	1638	1623	1646	1629

*Run #292 - C + D at Short Tube Rates

		288	289	290	291		292*	293	294	295	296	
10120	Reverse Ni	1783	1725	1658	1654	Filled with fresh	1563	1504	1496	1569	1529	
21	to can 4 days	1833	1775	1717	1704	21% KOH + 2g. SiOH	1623	1563	1571	1638	1592	Sent Back to Hooper
22	at 70 m-a, hot - 130°F.	1810	1758	1700	1690	Set stand 4 weeks	1607	1550	1565	1629	1583	

7/3/08

TUBE CELLS. (Song Tubes.)

Electrolyte — 21 % KOH.

Have had 254 hot and 23 normal runs.

	5TH RUN	MAX. RUN		278	279		280	291	282		283	284	285	286	287
10123	1558		254 Hot Runs	890	896	Reassembled	929	908	913	Reverse Ni	977	931	913	950	933
24	1550			992	1000	with new	1054	1042	1025	to cam 4 days	1110	1063	1056	1079	1071
25	1538			1213	1200	changed Fe's	1258	1244	1225	at 70 m-a	1344	1279	1227	1292	1271

* Run* 292 - C + D at Short Tube Rates

		288	289	290	291		292	293	294	295	296	
10123	Reverse Ni	1075	1073	992	988	Filled with 21 %	1000	1021	1063	1150	1079	
24	to cam 4 days at 70 m-a,	1192	1229	1154	1142	KOH + 2% Si OH.	1160	1146	1160	1246	1192	Sent Back to Hopfey
25	hot - 130°F.	1413	1358	1269	1300	Set stand 4 weeks	1317	1288	1283	1350	1300	

7/6/08

FE CELLS.

Fes from tube cells # 10120-22.
Electrolyte - 21 % KOH.

	1	2	3		4	5	6	7
10120 F	815	1075	1370	next run	1375	1460	1610	1600
21 F	885	1070	1360	charge 60 hrs.	1377	1387	1500	1545
22 F	780	940	1200	at 100 m-a.	1250	1275	1380.	1400

7/4/08

FE CELLS

Fes from tube cells 10120-22.
Electrolyte — 21 % KOH.

	1	2	3		4	5	6	7	
10120FF	880	1242	1375	Test run	1250	1340	1400	1392	Add K_2S, 3 g.
21FF	740	950	1200	charge 6 hrs	1206	1375	1432	1300	" " 6 g.
22FF	767	1000	1270	at 1000 m-a.	1245	1375	1425	1300	" " 9 g.

7/6/08

FE CELLS.

Fes from tube
Electrolyte —

	1	2	3	4	5	6	7	8
10123 F	962	1200	1470	1592	1665	1655	1575	1645
24 F	900	1130	1350	1462	1570	1587	1420	1560
25 F	1062	1200	1455	1630	1685	1660	1515	1615

cells 10123-25.
21 %. KOH.

C.D.

7/6/08

FE CELLS.

Fes from tube cells 10123-25.
Electrolyte – 21 % KOH.

	1	2	3	4	5	6	7	8
10123FF	887	1050	1285	1405	1490	1520	1390	1460
24FF	900	1225	1400	1457	1536	1527	1440	1550
25FF	1050	1132	1400	1540	1640	1647	1450	1575

C.O.

7/10/08.

A4 #11.

Output on 1 hour charge at 60 amps

When discharged to, and charged from 1.2V.

Run #43	57 A-H to 1.2V.	
44	55 "	"
45	54 "	"
	166 ÷ 3 = 55.3 A-H Average	

When discharged to, and charged from 1 V.

Run #46	52.2 A-H to 1V.	
47	52 "	"
48	52.5 "	"
	156.7 ÷ 3 = 52.2 A-H Average	

7/20/08

TUBE CELLS (new)

		ELECTROLYTE	*1	2	3	4	5	6	7
699	A	21% KOH + 2g. SiOH	1020	1187	1163	1087	1052	1093	1072
"	B	" "	953	1175	1157	1059	1035	1077	1040
700	A	" 4g. SiOH	960	1193	1177	1115	1080	1115	1090
"	B	" "	1013	1210	1190	1142	1107	1153	1133
701	A	" 6g. SiOH	990	1195	1183	1110	1067	1107	1080
"	B	" "	983	1195	1183	1129	1090	1127	1102
702	A	" 8g. SiOH	980	1170	1183	1107	1070	1110	1087
"	B	" "	970	1133	1120	1087	1065	1093	1083
703	A	" 10g. SiOH	927	653	1100	1033	1010	1053	1020
"	B	" "	903	600	1067	1053	1029	1069	1060

21% KOH put in all.*

* Solution Changed { In "As" after 2nd Discharge
" "Bs" " 3rd Charge

7/30/08

TUBE CELLS

Experiment #704

See history of these cells on the preceding page.

		8	9	10	11	Set Stand 4 Weeks –	12	13	14	15	16		17	18	19
699 A	Filled with 21% KOH + 2g. LiOH	1170	1170	1200	1214	At Room Temp.	1180	1183	1153	1217	1203	Changed Solution	1247	1233	1250
" B		1189	1147	1180	1203	Discharged	1153	1180	1133	1190	1183		1227	1213	1227
700 A		1185	1169	1199	1217	At Room Temp.	746	1123	1103	1197	1193		1220	1223	1230
" B		1219	1193	1227	1244	Charged	810	1167	1150	1240	1253		1290	1273	1291
701 A		1173	1160	1199	1220	At 130° F.	950	1127	1127	1173	1177		1227	1220	1207
" B		1180	1163	1200	1223	Discharged	987	1140	1134	1190	1193		1227	1220	1213
702 A		1175	1157	1193	1218	At 130° F.	33	1037	1100	1130	1133		1293	1258	1267
" B		1133	1123	1177	1193	Charged	53	1107	1093	1120	1127		1233	1223	1223

7/30/08.

TUBE CELLS.

Experiment #705.

See previous history under 7/20/08

	ELECTROLYTE	7		8	9	10	11	12		13	14	15
703 A	21% KOH	1020	Filled both with 10% KOH + 30 g. SiOH per l. and let soak 4 weeks – "A", normal; "B", at 130°F. Then put in 21% KOH + 2g. SiOH	1057	1070	1057	1120	1113	Changed Solution	1143	1160	1173
703 B	" "	1060		1027	1080	1053	1123	1128		1141	1130	1160

10/24/08

Low Capacity E18 Cells.

Cells were filled with 10 % KOH + 30 g. SiOH per liter and given two runs in the Testing Department. The first runs here are in this same solution.

Charged 15 hrs. at 30 amps. Discharged at 30 amps.

	1	2		3	4		5	6
14701	71.5	69	Reversed 30 hrs. at 15 amps.	80	78	Put in	77.5	79
15177	54.5	52.5	Same, at temp. of 130°F.	69	67.5	21 % KOH	67.5	70
15321	75	73.5	Set soak 30 hrs. at temp. of 120°F.	777	78	Solution	74.5	75

11/9/08.

TUBE CELLS.

Electrolyte – 21 %. KOH + 2 g. SiOH per 175 cc.
Have had 100 hot runs.

	110	111		112	113	114		115	116	117	118
301 A	817	827	Reversed + Dschg at 50 m-a.	1040	937	917	Reversed + Dschg at 50 m-a. Changed Solution	1080	943	910	873
302 A	967	993		1213	1117	1113		1253	1150	1103	1077
303 A	987	1004		1210	1117	1083		1230	1113	1073	1043
304 A	1193	1220		1317	1247	1233		1360	1267	1213	1187
305 A	1223	1250		1320	1253	1240		1357	1257	1213	1200
306 A	1247	1290		1360	1283	1271		1371	1283	1220	1200

	Discharg'd at 130°			Discharg'd norm.		
	Charged 45 hrs. @ 100	Ditto	15 hrs. @ 300	15 hrs. @ 300	Ditto	Ditto
	119	120	121	122	123	124
302 A	1427	1503	1430	1143	1147	1100
303 A	1367	1490	1427	1117	1090	1060

11/14/08.

T.A.E. TUBE #546 A (Bismuth)

Electrolyte – 21%. KOH + 2g. SiOH.

Reversed 48 hrs. @ 100 m-a.
Then gave runs as shown below,— charging 15 hrs. @ 300 m-a and discharging @ 200 m-a:

Run #	1	Normal Test	123	M-A-H TO 1V
"	2	"	53	"
"	3	"	56	"
"	4	"	36	"

Gave 8 Regular Hot Runs at 130°F.

Run #	13	Normal Test	233	M-A-H TO 1V
"	14	"	243	"
"	15	"	256	"
"	16	"	293	"
"	17	Norm Chg., Hot Dischg.	483	"
"	18	" "	523	"
"	19	" "	513	"
"	20	Normal Test	323	"
"	21	"	316	"
"	22	"	300	"
"	23	Hot Chg. + Hot Dischg.	430	"
"	24	" "	516	"
"	25	" "	513	"

12/4/08.

T.A.E. TUBES #706 A and 714 A.

Electrolyte - 21 % KOH + 2 g. SiOH.

Tubes were given a half-rate charg and regular discharge, and then were charged at one-half rate again after this, they were soaked in H_2O 48 hours and then dried.

RUN	CHARGE	DISCHG.	M-A-H TO 1V. #706	#714	REMARKS
1	——	at 200	847	763	
2	15 hrs.@300	"	1113	1100	
3	"	"	1133	1107	
4	"	"	1155	1140	
5	"	"	1170	1153	
6	"	"	1170	1157	
7	"	"	1180	1167	

#228 Ni(OH)₂
" 24 " Flake

12/14/08.

ABSTRACT OF RESULTS OF "A4" HOT ENDURANCE TEST.

Outputs here given are to 1V. — after 15 hours charge at 30 amps. Each figure is the average of two similar cells (except for #210 + 216) The output on the last of each series of normal runs was taken.

CELLS		ELECTROLYTE	Output New	After 25 Hot	After 50 Hot	After 100 Hot	In New Electrolyte 21 % KOH.	After 150 Hot	After 200 Hot	" In New 21 % KOH	After Various Treatments	
			7	36	65	122	126	193	238	243	254	
*210	✓	10.6 % KOH + 109 g. SiOH	167.5	200.7	203.7*	186.5	194.5	180*	173.5	174.5	176	Ⓟ ac.
211 + 14	✓	15 % " 103 g. "	168.8	193.2	194	178	183.8	167.7	157.3	163	165	Ⓟ ac.
212 + 15	✓	19.2 % " 98 g. "	173	196	192.2	177.5	185.2	166.5	155.9	163	164	Ⓟ ac.
216	X	21 % " 15 g. "	130.5	129.5	146.5	145.7	148.7 ⊙	184.5	167.5	168	167	Ⓟ ac. (#216 Run 132 [illegible])
218 + 19	X	21 % " 30 g. "	136	143.2	155.8	162	163.5	148.5	140.3	141.7	143.5	Ⓟ ac.
220 + 23	X	21 % " 45 g. "	145.2	158.6	176.3	178	179.2	161.2	152.8	156.5	158.5	Ⓟ ac.
224 + 25	X	21 % " 60 g. "	151.8	166.7	180.7	180.1	183.5	166.5	160.5	165.7	166	Ⓟ ac.
226 + 28	X	21 % " 75 g. "	157	174	187.3	185	184.2	167.2	163	169.5	174.2	Ⓟ ac.
229 + 30	✓	24 % " 45 g. "	150.2	161.7	175.3	176.7	179.7	162.7	156.5	161.5	158.6	Ⓟ ac.
# 388		21 % KOH + 120 g. SiOH	211		189					99.6	% of Max.	
400		" " "	202		191.2					99.7	"	

* 21 % KOH was put in #210 after 50, also after 150, hot runs.

⊙ 105 g. SiOH was added to #216 after 100 hot runs.

1/7/09

TUBE CELL #9647-T.A.E.

One short tube put up with two Fes which contain no Mercury.

Electrolyte - 21 %. KOH + 2 g. LiOH.

RUN	CHARGE	DISCHG.	M-A-H TO IV	REMARKS
1	15 hrs. @ 300	At 200	1027	
6	"	"	1113	
12	"	"	1112	
	25 Hot Runs. Changed Solution			
43	15 hrs. @ 300	At 200	1283	
	25 Hot Runs (Total = 50) Changed Solution			
75	15 hrs. @ 300	At 200	1250	
	50 Hot Runs (Total = 100) Changed Solution			
130	15 hrs. @ 300	At 200	1060	
	50 Hot Runs (Total = 150) Changed Solution			
187	15 hrs. @ 300	At 200	983	
	50 Hot Runs (Total = 200) Changed Solution			
243	15 hrs. @ 300	At 200	820	

W.E.H. #690

1/18/09.

FE CELLS #717 – 720.

One regular "A" type Fe against four tubes in metal cans containing 160 cc of electrolyte. Average Weight of Fes = 8.12 g.
Cells charged 48 hrs. @ 160 m-a on 1st run; after that, 15 hrs. @ 320 m-a.
Discharge rate – 320 m-a. Discharged not more than 8 hours.

			1	2	3		7	8	9		10	11	12	Prev. lost 2 Da. 13	14
717	A	21 %. KOH	2176	2058	2037	Discharged at 800 m-a three times.	2282	2181	2219	Put in 21 %. KOH	2266	2224	2197	2133	2224
"	B	"	2336	2164	2096		2389	2368	2272		2325	2293	2277	2218	2288
"	C	"	2432	2192	2240		2485	2378	2357		2378	2378	2330	2320	2368
718	A	21 %. KOH + 11.4 g. SiOH per S.	2362	2224	2053		2336	2272	2240		2240	2250	2261	2229	2272
"	B	" "	2453	2208	2080		2389	2346	2346		2346	2378	2373	2373	2410
"	C	" "	2346	2095	1972		2240	2136	2136		2136	2202	2197	2213	2256
719	A	21 %. KOH + 90 g SiOH per S.	1493	See Note			—	—	—		1408	1845	2058	2090	2208
"	B	" "	2560	2026	1920		—	—	—		1893	2304	2400	2416	2421
"	C	" "	1093	See Note			—	—	—		1386	1831	2042	2106	2208
720	A	Saturated SiOH (120 g. per S)	12*	2090	1893		2282	2186	2213		2240	2240	2240	2213	2282
"	B	" "	12*	1984	1877		2261	2186	2224		2224	2229	2208	2154	2218
"	C	" "	26*	1957	1813		2044	2112	2090		2096	2117	2090	1978	2112

*21 %. KOH was put in #720 A-C after the 1st run.

Note – Cells *719 A-C had a peculiar, low-voltage curve. On the runs for which no figures are given, the reading was less than 1.00 V. at the start. Curve was O.K. after the 21 %. KOH was put in.

3/17/09.

A4 #404, (Old Loading.)
Condensation of Results.

Electrolyte - 21% KOH + 120 g. SiOH.
Charge and discharge rate: 30 amps.

Runs	#1-3	Overcharge tests.	3rd run =	167.5	to 1V.
"	4-15	7-hour charges.	Average	164.2	"
"	16	15-hour charge	—	189	"
"	17	" "	—	192	"
"	18-29	7-hour charges	Average	171.9	"
"	30	15-hour charge	—	199.7	"
"	31-42	7-hour charges	Average	174.6	"
"	43	15-hour charge	—	205	"

(See following page)

4/2/09.

A4 #404, (Old Loading.)

Electrolyte: 21 %. KOH + 120 g. LiOH.
#734 $Ni(OH)_2$; #1a Nickel Flake.

RUNS	CHARGE	DISCHG.	#404	REMARKS
3	15 hrs. @ 30	At 30	167.5 to 1V.	
4 - 15	7 hrs. @ 30	"	164.2 "	Average - 12 Runs
16	15 hrs. @ 30	"	189.0 "	
17	" "	"	192.0 "	
18 - 29	7 hrs. @ 30	"	171.9 "	Average - 12 Runs
30	15 hrs. @ 30	"	199.7 "	
31 - 42	7 hrs. @ 30	"	174.6 "	Average - 12 Runs
43	15 hrs. @ 30	"	205.0 "	
44 - 55	7 hrs. @ 30	"	176.1 "	Average - 12 Runs
56	15 hrs. @ 30	"	205.0 "	
57	" "	"	205.0 "	
58 - 83	7 hrs. @ 30	At 40	182.6 to .50	26 Runs
84	15 hrs. @ 30	At 30	207.5 to 1V.	
85	"	"	210 "	
86 - 111	7 hrs. @ 30	At 40	179.5 to .5V.	26 Runs
112	15 hrs. @ 30	At 30	205 to 1V.	
113	"	"	204 "	
114	"	"	205 "	

Note. 7-hour-charge runs up to #55 were made under commercial conditions, i.e., - one run per day.

4/2/09.

A4 #466 + 467, (Old Loading.)

#466 – Electrolyte: 21 g. KOH + 120 g. $LiOH$.
#467 – " " " 100 g. $LiOH$.
Both contain #735 $Ni(OH)_2$ and #16A Flake

RUNS	CHARGE	DISCHG.	#466	#467	REMARKS
3	15 hrs. @ 30	At 30	165.0 to 1V.	178.0 to 1V.	
4-15	7 hrs. @ 30	"	165.4 "	166.1 "	Average, (12 runs)
16	15 hrs. @ 30	"	196.0 "	193.5 "	
17-28	7 hrs. @ 30	"	175.3 "	171.9 "	Av. (See Spec. Runs)
29	15 hrs. @ 30	"	206.7 "	203.5 "	
30-41	7 hrs. @ 30	"	177.5 "	174.0 "	Av. (See Spec. Runs)
42	15 hrs. @ 30	"	211.2 "	206.0 "	
43-54	7 hrs. @ 30	"	180.2 "	176.2 "	Av. (12 Runs)
55	15 hrs. @ 30	"	212.0 "	208.5 "	
56	"	"	212.5 "	208.5 "	
57-82	7 hrs. @ 30	At 40	178.3 to .5V.	168.9 to .5V.	26 Runs
83	15 hrs. @ 30	At 30	199.0 to 1V.	199 to 1V.	
84	"	"	201.0 "	199.5 "	
85	"	"	201.7 "	199.5 "	
86-111	7 hrs. @ 30	At 40	176.4 to .5V.	169.5 to .5V.	26 Runs
112	15 hrs. @ 30	At 30	201.5 to 1V.	202.2 to 1V.	
113	"	"	201.5 "	201 "	
114	"	"	205.2 "	205.2 "	

Note. 7-hour-charge runs up to #54 were made under commercial conditions, i.e. – one run per day.

4/2/09

A4 #468, (Old Loading.)

Electrolyte: 8 % KOH + 120 g. LiOH for 3 runs, — then 25 % KOH.
#735 $Ni(OH)_2$; #16A Nickel Flake.

RUNS	CHARGE	DISCHG.	#468	REMARKS
5	15 hrs. @ 30	At 30	171.0 to 1V.	
6-17	7 hrs. @ 30	"	165.4 "	Average, (12 runs)
18	15 hrs. @ 30	"	192.5 "	
19-30	7 hrs. @ 30	"	170.2 "	Average, (12 runs)
31	15 hrs. @ 30	"	202.5 "	
32-43	7 hrs. @ 30	"	171.3 "	Average, (12 runs.)
44	15 hrs. @ 30	"	201.5 "	
45-56	7 hrs. @ 30	"	175.9 "	Average, (12 runs.)
57	15 hrs. @ 30	"	203.5 "	
58	"	"	207.5 "	
59-84	7 hrs. @ 30	At 40	165.2 to .5V.	26 Runs
85	15 hrs @ 30	At 30	201.5 to 1V.	
86	"	"	201.0 "	
87	"	"	199.2 "	
88-113	7 hrs. @ 30	At 40	164.9 to .5V.	26 Runs
114	15 hrs. @ 30	At 30	206.5 to 1V.	
115	"	"	204.2 "	
116	"	"	207.7 "	

Note. 7-hour-charge runs up to #56 were made under commercial conditions, i.e., — one run per day.

4/13/69

A4 #478-480, (New Loading.)

#478 - Electrolyte: 217. KOH + 90 g. SiOH.
479 - " " 105 g. SiOH.
480 - " " 120 g. SiOH.
In all: #739 $Ni(OH)_2$; #28 KN + 203 BN Flake.

RUNS	CHARGE	DISCHG.	#478	#479	#480	
8	15 hrs.@30	At 30	181 to 1V.	174.5 to 1V.	182.7 to 1V.	
9-24	7 hrs.@30	"	165.7 to .5V.	170.9 to .5V.	177.8 to .5V.	16 Runs.
25	15 hrs.@30	"	204.2 to 1V.	200 to 1V.	201.5 to 1V.	
26	"	"	198.5 "	196.7 "	200 "	
27	"	"	204.3 "	200 "	201.5 "	
28-44	7 hrs.@30	At 40	164.5 to .50	170.1 to .50	175.8 to .50	17 Runs
45	15 hrs.@30	At 30	199 to 1V.	198 to 1V.	200 to 1V.	
46	"	"	196 "	195.5 "	197 "	
47	"	"	200.5 "	200 "	202.5 "	
48-64	7 hrs.@30	At 40	165.1 to .50	173.2 to .50	178.1 to .50	17 Runs
65	15 hrs.@30	At 30	195.2 to 1V.	194.7 to 1V.	194.7 to 1V.	
66	"	"	204.5 "	204 "	203.5 "	
67	"	"	203.5 "	205 "	206.2 "	
68-92	7 hrs.@30	At 40	168.6 to .50	175.7 to .50	177.9 to .50	25 Runs
93	15 hrs.@30	At 30	197 to 1V.	188.5 to 1V.	180 to 1V.	
94	"	"	196.5 "	193.5 "	190.5 "	
95	"	"	198 "	193.5 -	189 "	
96-120	7 hrs.@30	At 40	168.1 to .50	180.1 to .50	186 to .50	25 Runs
121	15 hrs.@30	At 30	200 to 1V.	197 to 1V.	190 to 1V.	

RUNS	CHARGE	DIS.	#478	#479	#480	
122	15 hrs.@30	At 30	202.5 to 1V.	200 to 1V.	200 to 1V.	

4/13/09.

A4 #481-483, (New Loading.)

Electrolyte: 8 g. KOH + 120 g. LiOH for
3 runs, — then 25 g. KOH.
#739 $Ni(OH)_2$; 28 KN + 203 BN Flake.

RUNS	CHARGE	DISCHG.	#481	#482	#483	
6	15 hrs. @ 30	At 30	166.2 to 1V.	167.8 to 1V.	167.7 to 1V.	
7-24	7 hrs. @ 30	"	169 to .50	170.4 to .50	167.4 to .50	18 Runs
25	15 hrs. @ 30	"	189.2 to 1V.	190 to 1V.	188.5 to 1V.	
26	"	"	192.2 "	193.2 "	191.5 "	
27-42	7 hrs. @ 30	At 40	169 to .50	170.3 to .50	168.7 to .50	16 Runs
43	15 hrs. @ 30	At 30	197.5 to 1V.	199 to 1V.	197.5 to 1V.	
44	"	"	197.2 "	198.2 "	196.5 "	
45	"	"	197.2 "	199.2 "	197.2 "	
46-61	7 hrs. @ 30	At 40	169.7 to .50	169.4 to .50	167.1 to .50	16 Runs.
62	15 hrs. @ 30	At 30	195 to 1V.	191.2 to 1V.	193.2 to 1V.	
63	"	"	194.7 "	195 "	194 "	
64	"	"	198 "	198 "	197.5 "	
65-89	7 hrs. @ 30	At 40	171.4 to .50	172.2 to .50	168.8 to .50	25 Runs
90	15 hrs. @ 30	At 30	199.2 to 1V.	197 to 1V.	197.7 to 1V.	
91	"	"	202 "	199.5 "	200 "	
92	"	"	202.5 "	200.7 "	199.7 "	
93-117	7 hrs. @ 30	At 40	169.1 to .50	171 to .50	169 to .50	25 Runs
118	15 hrs. @ 30	At 30	194.5 to 1V.	193.2 to 1V.	195 to 1V.	
119	"	"	200 "	198.7 "	199.5 "	
120	"	"	205 "	204 "	203.7 "	

4/14/09

A4 #484-486, (New Loading.)

Electrolyte: 21% KOH + 120 g. LiOH.
#739 Ni(OH)$_2$; #28 XN + 203 BN Flake

Runs	Charge	Dischg.	#484	#485	#486	
5	15 hrs. @ 30	At 30	173.5	175.0	173.5	
6-17	7 hrs. @ 30	At 40	174.1	173.8	170.0	12 Runs
18	15 hrs. @ 30	At 30	189.0	189.0	186.5	
19	"	"	188.5	190.0	188.0	
20	30 hrs. @ 15	"	202.5	206.5	202.5	(P.S.)
21	"	"	198.7	200.0	198.0	
22	15 hrs. @ 30	"	200.0	200.0	199.5	
23	"	"	198.5	199.5	197.5	
24	"	"	209.2	209.5	208.0	(P.S.)

Sent cells to General Electric Company.

Note. Output to 1V. is given on normal-rate runs (30 amp), but output to .5V. on runs at higher rates.

4/14/09

A4 # 487-489. (New-Loading.)

Electrolyte: 21 %. KOH + 120 g. LiOH.
#739 $Ni(OH)_2$; #9 Flake.

RUNS	CHARGE	DISCHG.	#487	#488	#489.	
5	15 hrs. @ 30	Out 30	169.0	168.5	170.0	
6-17	7 hrs. @ 30	Out 40	165.1	163.3	165.7	12 Runs
18	15 hrs. @ 30	Out 30	183.0	180.0	183.0	
19	"	"	184.0	180.0	184.0	
20	30 hrs. @ 15	"	200.0	196.5	200.0	(P.S.)
21	"	"	194.5	192.0	194.0	
22	15 hrs. @ 30	"	195.0	193.0	193.7	
23	"	"	192.5	190.7	192.5	
24	"	"	205.0	203.0	205.0	(P.S.)
	Sent cells to General Electric Co. - except #488.					
25	15 hrs. @ 30	Out 30		197.0		(P.S.)
26	"	"		196.5		
27-64	7 hrs. @ 30	Out 40		163.5		38 Runs
65	15 hrs. @ 30	Out 30		175		
66	"	"		186.7		
67	"	"		195.5		

Note. Output to 1V. is given on normal-rate runs, (30 amp.), but output to .5 V. on runs at higher rates.

5/5/09

Test of Electrolyte in A4 Cells after 5 months of servis in a truck of the Fonograf Co.

A4	#231	sp. gr.	1.152	@ 22°C.
"	232	"	1.142	"
"	376	"	1.153	"
"	380	"	1.180	"
"	387	"	1.147	"
"	390	"	1.183	"

Electrolytes:

#231 + 232 had first 21% KOH + 15 g. SiOH; then saturated SiOH; then two changes of 21% KOH.

#376 – 21% KOH + 120 g. SiOH, then 21% KOH straight.

#380 – 21% KOH + 120 g. SiOH

#387 – " " "

#390 – four changes of 21% KOH + 45 g. SiOH per liter.

These cells have run 2216 miles in the truck.

Analyses by Grothe:

Cell #376 = 15.09 % KOH ; 1.08 % SiOH.

" #387 = 13.68 % " ; 1.65 % "

5/6/09.

Test of Electrolyte in A4 Cells which have been in a Fonograf Co. truck since June 16, 1908 – 10 ½ months.

A4	#82	sp. gr.	1.163	@ 27°C.
"	108	"	1.137	"
"	110	"	1.163	"
"	111	"	1.166	"
"	125	"	1.143	"
"	128	"	1.148	"

Original Electrolyte: 21% KOH + 15 g SiOH. This was changed once before battery was put in the truck.

These cells have run 5302 miles in the truck.

COMPARISON

A4 Cell with 100 g. $LiOH$ in 21 % KOH.
Long Tube Cell with 21 % KOH + 2 g. $LiOH$ sol.

	A4 CELL	SMALL CELL
Proportion of Fe to Ni	8 : 1	2 : 1
Electrolyte per Tube	11.25 cc.	240 cc.
$LiOH$ per Tube	.83 g.	2.7 g
$LiOH$ Concentration	75 g. per l.	11.2 g per l.
Charge Rate for 15 hrs.	30 amps.	48 amps.
Charge Temperature	90 – 105°	75. – 85°
Discharge "	90 – 105°	80. – 90°
Solution Renewed	225 runs.	50 runs

6/25/09.

Runs of Tube Cells #475A-477A (Bi), and #697 A-C, made in Connection with Experiment #903.
A-H to IV. on Normal Temperature Runs only, is given.

RUN #475	NO. #697	CHARGE	DISCHG.	#475A	#476A	#477A	#697A	#697B	#697C	
205	109	15 hrs. @ 300	At 200	1507	1517	1523	1271	1240	1270	
206	110	" "	"	1500	1517	1517	1267	1237	1263	
207	111	" "	"	1480	1523	1523	1291	1267	1283	
208	112	7 hrs. @ 200	"	1147	1145	1127	1040	1033	1037	
209	113	" "	"	1158	1162	1167	1028	1012	1012	
210	114	" "	"	1160	1173	1170	1097	1071	1067	Prev. Idle
211	115	" "	"	1140	1153	1150	1068	1050	1033	
212	116	" "	"	C - Cold A - Norm.	C - Norm. A - Cold	1110	C - Cold A - Norm.	C - Norm. A - Cold	1010	
213	117	" "	"			1101			1000	
214	118	" "	"			1090			998	
215	119	" "	"	1077	1151	1100	1000	1033	974	
216	120	" "	"	1170	1174	1183	1101	1074	1081	Prev. Idle
217	121	" "	"	1147	1153	1157	1091	1053	1067	
218	122	15 hrs. @ 300	"	1563	1577	1580	1420	1353	1380	
219	123	" "	"	1583	1594	1600	1420	1360	1390	

9/13/09.

Experiments on Charging by Voltage.

A4 Cell #646,

(Results corroborated by tests of cells #643 and 775 which were in series.)

Charged at 30 amp's until voltage exceeded 1.78 and remained practically constant, - increasing not more than .005 V. in 30 minutes.

Discharged 150 A-H, each run:

Run #118	Charged	192.5	A-H to constant V.
" 119	"	185.0	" "
" 120	"	195.0	" "
" 121	"	180.0	" "
" 122	"	180.0	" "
" 123	"	187.5	" "
" 124	"	182.5	" "
" 125	"	185.0	" "
		185.9	" Average

A-H Output $\frac{150.0}{185.9}$ = 80.7 % Efficiency
" Input

Charge exceeds discharge by 23.9 %

Discharged 100 A-H, each run:

Run #126	Charged	135	A-H to constant V.
" 127	"	127.5	" "
" 128	"	142.5	" "
" 129	"	137.5	" "
" 130	"	132.5	" "
" 131	"	125.0	" "
		133.3	" Average

A-H Output $\frac{100.0}{133.3}$ = 75 % Efficiency
" Input

Charge exceeds discharge by 33.3 %

Cell, when charged 7 hours at 30 amp's and discharged at 30 amp's to 1 V., gives an average output of 173 A-H:

A-H Output $\frac{173.0}{210.0}$ = 82.4 % Efficiency
" Input

Charge exceeds discharge by = 21.3 %

11/1/09.

Wagon Performance

with Edison and with Lead Battery Equipments of Equal Weight.
Battery capacities figured on actual basis, i.e.—
Lead, 8 Watt-hours per pound
Edison, 15 " " "

Wagon weights based on Saunders standards.

WAGON CAPACITY	TOTAL WEIGHT		BATTERY WEIGHT	W-H CAPACITY		W-H PER TON-MILE	W-H PER WAGON-MILE		MILES PER CHG. – LEAD			MILES PER CHG. – EDISON		
	EMPTY	LOADED		LEAD	EDISON		EMPTY	LOADED	EMPTY	½ LOAD	FULL LOAD	EMPTY	½ LOAD	FULL LOAD
350	2100	2450	850	6800	12750	110	115.5	134.7	58.8	54.6	50.4	110.3	102.4	94.6
1000	3050	4050	1200	9600	18000	100	152.5	202.5	62.9	55.1	47.4	118.0	103.4	88.9
3000	3850	6850	1200	9600	18000	90	173.2	308.2	55.4	43.2	31.1	103.8	81	58.3
6000	5300	11300	1700	13600	25500	80	212.0	452.0	64.1	47.1	30.1	120.2	88.3	56.4

FEB 17 1910

COMMERCIAL TYPES OF THE LALANDE CELL

Abstract of Data from Tests made subsequent to March 1st, 1909.

A4 CELLS #643., 646, + 775.

Tabulation of Results Obtained on Tests #171 – 229, – charging at different rates for various lengths of time, and discharging at 30 amps to one volt.

Each ampere-hour figure given is the average of all three cells on two or more runs.

RUNS	CHARGE	A-H INPUT	AV. OUTPUT	
174-176	4 hrs. @ 60	240	167.9	
171 + 172	3 " "	180	148.2	
177-179	2 " "	120	111.2	
180-182	1 " "	60	57.5	+ Green
183 + 184	$5\frac{1}{5}$ hrs. @ 50	260	177.1	
186 + 187	4 " "	200	158.9	
188 + 189	3 " "	150	134.1	
190-192	2 " "	100	94.6	✓ Violet
193 + 195	7 hrs. @ 40	280	185.4	
196 + 198	$5\frac{1}{4}$ " "	210	172.1	
199 - 201	4 " "	160	144	
202 - 204	3 " "	120	114.8	○ Red
205 + 206	10 hrs. @ 30	300	192.5	
208 + 209	7 " "	210	174.6	
210 - 212	$5\frac{1}{2}$ " "	16.5	150.7	
213 - 217	4 " "	120	114	× Black
218 + 220	16 hrs. @ 20	320	194.5	
221 + 222	$10\frac{1}{2}$ " "	210	178.6	
223 - 225	$8\frac{1}{4}$ " "	165	151.1	
227 + 229	6 " "	120	109.6	• Yellow

JUN 13 1910

A4 CELL #478.

Output at 30 amp's on 15 hr. charge @ 30.

DATE	RUN	AMP-HR. OUTPUT			OUTPUT IN PER CENT		
		To 1V.	To .9V	To .5V	To 1V.	To .9V	To .5V
3/5/09	5	178.5	186.0	190.0	100.0	100.0	100.0
3/24/09	27	202.0	206.5	209.7	113.2	111.0	110.3
4/8/09	47	200.5	204.5	209.2	112.3	109.9	110.1
4/23/09	67	203.5	208.0	214.0	114.0	111.8	112.7
5/13/09	95	198.0	204.7	212.7	110.9	110.1	112.0
6/2/09	122	202.0	208.0	215.5	113.2	111.8	113.3
7/14/09	176	188.5	195.3	203.2	105.7	105.0	106.8
9/11/09	251	194.2	206.5	220.0	108.8	111.0	115.8
		New Solution: 21 % KOH + 22.5 g. LiOH per l.					
9/18/09	258	205.0	215.2	226.5	114.8	115.7	119.2
10/26/09	311	188.0	203.3	219.5	105.3	109.3	115.6
12/8/09	364	181.5	200.0	222.0	101.7	107.6	116.8
1/14/10	416	192.0	208.5	228.0	107.6	112.1	120.0
2/22/10	470	190.0	203.0	219.0	106.4	109.2	115.2
		New Solution: 21 % KOH + 11.2 g. LiOH per l.					
3/1/10	477	198.0	212.0	229.0	110.9	114.0	120.5
4/5/10	531	191.5	203.0	219.5	107.3	109.2	115.6
5/7/10	583	181.5	195.0	215.5	101.7	104.9	113.4

JUN 13 1910

A4 Cell # 468.

"Old" loading; special forming treatment.

Date	Run.	Amp.-Hr. Output			Output in Per Cent		
		To 1V	To .9V	To .5V	To 1V	To .9V	To .5V
2/12/09	5.	171.0	177.5	183.0	100.0	100.0	100.0
2/27/09	18	192.5	198.6	204.0	112.7	111.9	111.5
3/15/09	31	202.5	208.0	212.5	118.3	117.2	116.2
3/30/09	44	201.5	204.2	208.5	117.8	115.2	113.9
4/15/09	57	203.5	207.0	211.0	119.0	116.7	115.3
5/7/09	87	199.2	202.2	206.0	116.5	114.0	112.7
5/29/09	115	204.2	208.0	211.7	119.4	117.2	115.8
7/7/09	168	194.7	197.7	203.0	113.8	111.3	110.9
8/17/09	225	192.5	198.5	205.0	112.6	111.9	112.0
		New solution: 21 g. KOH + 11.2 g. LiOH per l.					
8/24/09	232	193.0	198.0	203.0	112.9	111.7	110.9
10/1/09	285	201.5	208.5	215.0	117.8	117.5	117.5
11/5/09	336	203.2	210.0	216.5	118.8	118.3	118.3
12/18/09	390	194.7	206.2	215.0	115.0	116.2	117.5
1/29/10	445	190.0	200.5	214.0	111.1	113.0	116.9
		New solution: 21 g. KOH + 11.2 g. LiOH per l.					
2/3/10	451	197.5	207.2	218.0	115.5	116.7	119.2
3/11/10	503	206.5	215.0	225.0	120.7	121.1	123.0
4/18/10	558	195.0	205.7	219.5	114.0	115.9	119.9
5/27/10	612	193.2	203.5	218.5	113.0	114.8	119.3

5/15/07.

Tubes, Set #1. Chg'd @ 200 m-a. Dis. @ 150.

	Chg'd 1 hr	2 hrs	3 hrs	4 hrs	5 hrs	6 hrs	7 hrs	10 hrs	Capacity on 5th Overcharge (5 hrs) 2/10/08.	Chg'd 6⅔ hrs @ 150	Chg'd 5 hrs @ 200	Chg'd 4 hrs @ 250	Chg'd 3⅓ hrs @ 300
5398	200	385	515	620	723	780	854	929	977	723	652	640	595
99	200	377	517	640	735	810	857	922	957	700	622	622	562
5400	197	377	517	632	723	805	852	937	975	725	660	642	598
5401	197	386	537	663	768	845	898	967	1006	777	715	700	657
02	190	386	537	666	768	850	902	955	992	720	650	640	597
03	195	386	535	663	763	842	886	947	990	735	672	655	607
5404	185	372	522	635	725	780	845	922	955	716	656	645	610
05	202	385	527	638	728	800	843	915	958	757	688	675	632
06	200	380	522	625	724	775	837	908	958	706	662	643	600
5407	185	360	492	600	697	774	840	957	990	692	632	617	560
08	190	360	510	625	725	813	878	975	1013	716	640	622	580
09	190	367	510	635	740	825	866	995	1031	717	650	630	586
5410	195	382	535	657	750	820	898	921	960	717	670	667	633
11	202	375	535	657	750	823	862	897	946	738	682	681	650
12	200	386	537	668	761	823	870	910	961	725	677	673	645
5413	200	390	515	325	725	800	650	750	962	708	663	661	633
14	200	387	520	677	777	856	907	950	995	715	663	660	630
15	192	385	542	671	766	827	868	900	950	723	672	671	645
5416	192	385	535	647	747	816	860	893	942	715	658	657	617
17	190	385	537	660	758	825	870	920	962	725	675	670	636
18	190	385	537	655	747	823	863	905	963	716	666	667	631
5419	192	381	537	673	778	857	910	952	1001	743	687	685	650
20	192	381	540	670	772	848	899	947	990	756	697	695	662
21	192	385	542	670	771	847	892	947	990	732	682	677	647

50 Hot Runs:

This lot of Tubes was not tested for efficiency at other rates of charge, when new. After 50 hot runs, the capacity, when 1000 m-a-h is put in at different rates, is as follows:—

Lot #1.
After 100
Hot Runs.

	Capacity on Overcharge	Overcharge Cap. % of Original	Charged 6 2/3 hrs. @ 150	5 hrs. @ 200.	4 hrs. @ 250.	3 1/3 hrs. @ 300.	5 hr. Orig. Cap. % of Original
5398	952	97.3	695	617	567	542	85.4
99	925	96.6	667	597	542	507	81.3
5400	942	96.6	691x	612	558	522	84.8
5401	972	96.7	691	500	612	547	65.1
02	955	96.3	675	597	552	510	77.8
03	957	97.7	687	617	570	527	80.9
5404	940	98.4	700	625	581	548	84.2
05	937	97.9	693	620	521	531	85.2
06	927	96.8	700	625	580	548	86.4
5407	942	95.3	637	562	502	456	80.6
08	967	95.3	662	592	550	522	81.7
09	967x	93.8	672	585	521	467	79
5410	937	97.6	660	613	587	572	81.7
11	920	97.2	691	625	600	570	83.3
12	925	96.2	691	625	622	585	82.1
5413 14 15	Used for Special Tests.						
5416	917	97.4	700x	575	600	555	76.9
17	955	99.2	617	622	637	575	82.1
18	940	97.6	682	622	600	572	83.3
5419	965	96.4	705	652	628	600	83.9
20	960	96.9	720	667	637	605	86.4
21	967	97.7	712	652	625	595	84.6

After 150
Hot Runs

	Capacity on Overcharge	Overcharge Cap. % of Original	Chg'd 6 2/3 hrs. @ 150 m.a.	5 hrs. @ 200.	4 hrs. @ 250.	3 1/3 hrs. @ 300.	5 hr. Orig. Cap. % of Original
5398	930	95.1	640	580	518	473	80.2
99	931	97.3	648	581	528	477	79
5400	925	94.8	627	543	490	442	75.1
5401	945	94	697	638	588	543	83
02	937	94.5	637	562	516	477	73.3
03	942	96.1	662	606	551	512	79.4
5404	947	99.2	685	625	583	536	86.2
05	946	98.8	700	652	605	557	89.6
06	925	96.6	677	620	580	531	85.7
5407	890	89.9	567	501	455	403	71.8
08	975	96.2	665	600	545	496	82.8
09	932	90.4	632	560	507	473	75.6
5410	887	92.4	640	610	578	525	81.4
11	897	94.8	680	630	601	568	84
12	887	92.3	667	657	613	577	86.4
5413 14 15	Special Tests						
5416	902	95.8	672	643	610	565	86.
17	898	93.3	687	641	605	562	84.6
18	925	96.1	677	630	595	562	84.3
5419	912	91.1	705	671	630	591	86.3
20	925	93.4	587	650	607	552	84.1
21	950	96	702	673	632	597	87.2

Sot # 1.

After 200
Hot Runs

	Capacity on Overcharge.	Overcharge Cap. % of Original	Charged 6 2/3 hrs. @ 150.	5 hrs. @ 200.	4 hrs. @ 250.	3 1/3 hrs. @ 300	5 hr. Charg. Cap. % of Original
5398	880	90.1	555	485	450	402	74.4
99	907	94.8	665	585	552	501	94
5400	910	93.4	657	575	547	500	87.1
5401	935	93	707	620	597	547	86.7
02	900	90.7	655	553	528	475	85
03	900	91.9	667	580	542	512	86.3
5404	932	97.6	700	615	597	545	93.8
05	913	95.3	692	625	595	562	90.9
06	902	94.3	667	571	550	552	86.2
5407	920	92.9	630	535	502	455	84.6
08	920	90.7	662	572	545	503	88.4
09	905	87.7	650	562	530	490	88.5
5410	845	88	707	635	612	588	95.8
11	855	90.4	707	640	615	587	93.8
12	842	87.4	710	637	615	590	98.1
5413	850	88.3	712	665	640	610	100.3
14	955	95.5	782	718	675	642	100.2
15	845	88.9	685	625	602	565	93
5416	872	92.6	700	627	603	570	95.4
17	867	90.1	715	652	617	591	96.7
18	882	91.7	711	632	615	580	94.9
5419	888	88.7	727	658	640	602	95.7
20	922	93.1	747	655	637	587	93.9
21	922	93.1	725	662	637	605	97.1

After 200 Regular Runs

100 Hot
51 Normal
65 Special
Runs

Tubes, Set #2.

Charged @ 200 m-a. Run @ 150

	Chg'd 2 hrs.	3 hrs.	4 hrs.	5 hrs.	6 hrs.	7 hrs.	10 hrs.	Capacity on 5 hr. discharge (5th run) 2/21/07.	Chg'd 6 2/3 hrs. @ 150.	5 hrs. @ 200.	4 hrs. @ 250.	3 1/3 @ 300.
5586	377	505	607	712	787	861	997	1111	782	712	670	618
87	376	513	618	721	798	867	998	1111	787	721	685	640
88	367	500	602	700	772	842	980	1092	770	700	662	620
5589	372	513	616	707	772	827	925	1022	765	707	687	660
90	377	527	631	718	787	845	931	1030	770	718	695	657
91	377	525	630	735	791	850	940	1035	785	735	707	660
5598	375	508	610	717	795	873	1032	1181	790	717	666	622
99	375	511	615	722	806	882	1040	1185	795	722	680	637
5600	368	500	602	702	770	843	995	1155	770	702	666	607
5601	385 395	548 541	667 661	775 768	871 862	942 929.6	1080 1071	1175 1174	840 832	775 768	750 740	721 710
02	385	537	657	765	858	925	1075	1182	831	765	730	700
03	385	537	660	765	857	922	1058	1166	825	765	500	777
5604	352	492	587	687	735	806	922	1052	748	687	650	617
05	370	495	597	696	765	836	966	1082	768	696	657	620
5606½	349	492	567	665	700	760	840	955	702	665	605	570
5609	387	525	637	738	818	878	970	985	805	738	698	667
10	387	540	647	746	822	881	952	965	813	746	721	687
11	387	540	655	753	832	887	950	972	810	753	723	697

Lot #2. After 50 Hot Runs.

	Capacity on Overcharge 4/30/07.	Overcharge Cap. % of Original	Chg'd 6 2/3 hrs. @ 150 m-a	5 hrs. @ 200	4 hrs. @ 250	3 1/3 hrs. @ 300	5 hr. Chg. Cap. % of Original
5586	890	80	592	566	500	473	79.5
87	955	85.9	625	590	530	492	81.9
88	937	85.8	615	578	525	485	82.6
5589	842	82.3	562	547	498	478	77.4
90	862	83.7	590	578	535	510	80.5
91	892	86.2	627	612	568	540	83.3
5598	1080	91.4	667	620	567	512	86.5
99	1075	90.8	670	636	572	532	88
5600	900	77.9	555	522	465	450	74.4
5601	}						
02	} Having Special Tests.						
03	}						
5604	842	80	527	512	462	448	74.6
05	867	80.2	550	523	475	450	75.1
5606½	825	86.4	537	535	485	460	80.5
5609	967	98.2	687	650	595	552	88.1
10	950	98.4	690	655	611	571	87.8
11	922	94.8	671	635	587	563	84.4

5/18/07.

After 100 Hot Runs.

	Capacity on Overcharge 6/27/07.	Overchg. Cap. % of Original	Chg'd 6 2/3 hrs. @ 150 m-a.	5 hrs. @ 200	4 hrs. @ 250.	3 1/3 hrs. @ 300	5 hr. Chg. Cap. % of Original
5586	892	80.3	572	495	452	427	69.5
87	857	77.1	545	497	456	428	69
88	901	82.4	582	517	477	437	73.9
5589	792	77.4	515	482	445	417	68.2
90	847	82.3	567	510	495	442	71.1
91	880	85	580	533	505	470	72.4
5598	1010	85.4	595	531	485	445	74
99	975	82.3	595	535	488	452	74.1
5600	800	69.3	472	417	377	350	59.4
5601							
02							
03							
5604	787	74.8	520	457	430	397	66.5
05	807	74.5	522	462	432	395	66.4
5606½	745	78	492	447	420	392	67.3
5609	970	98.5	667	610	567	520	82.6
10	960	99.5	680	622	582	530	83.4
11	912	93.8	645	592	540	505	78.7

Sot #2. After 150 Hot Runs.

	Capacity on Overcharge	Overchg. Cap. % of Original	Chg'd 6 2/3 hrs @ 150 m-a	5 hrs. @ 200	4 hrs. @ 250	3 1/3 hrs @ 300.	5 hr. Chg. Cap. % of Original
5586	816	73.4	568	495	447	410	69.5
87	805	72.4	567	497	456	425	69
88	810	74.1	565	492	435	400	70.3
5589	672	65.7	482	447	410	380	63.3
90	807	78.3	585	542	510	472	75.6
91	810	78.3	591	537	487	450	73.1
5598	947	80.2	600	535	470	432	74.6
99	967	81.6	667	582	517	487	80.6
5600	787	68.2	525	467	420	395	66.5
* 5601	1067	90.7	670	615	552	510	79.3
* 02	1135	95.9	722	670	625	580	87.6
* 03	1112	95.5	727	675	625	582	88.2
5604	715	67.9	510	457	417	395	66.5
05	772	71.3	545	487	432	397	70
5606½	657	68.8	470	437	407	370	65.8
5609	896	91	662	588	542	497	79.7
10	921	95.4	650	580	517	478	77.8
11	860	88.4	642	572	522	485	76

* 5601-03 have had only 141 runs altogether — 74 of which were hot. Were given efficiency tests in different concentrations of KOH and NaOH. Now running regular in 21% KOH.

After 200 Hot Runs.

	Capacity on Overcharge	Overchg. Cap. % of Original	Chg'd 6 2/3 hrs @ 150 m-a.	5 hrs. @ 200.	4 hrs. @ 250.	3 1/3 hrs @ 300.	5 hr. Chg. Cap. % of Original
5586	812	73.1	562	488	445	402	68.5
87	795	71.6	555	480	440	400	66.5
88	795	72.7	553	470	437	390	67.2
5589	690	67.4	490	440	422	377	62.2
90	780	75.7	577	523	495	462	72.8
91	770	74.4	550	488	455	417	66.4
5598	952	80.6	605	527	480	432	73.5
99	972	82.1	650	567	517	467	78.5
5600	796	68.9	537	466	430	385	66.4
5601	1075	91.5	700	615	565	525	79.4
02	1070	90.4	675	612	572	530	80.1
03	1092	93.8	707	642	602	550	84
5604	725	68.8	530	475	442	415	69.1
05	755	69.7	552	482	452	407	69.3
5606½	697	73	487	417	425	405	62.8
5609	855	86.8	642	575	537	492	78
10	883	91.5	645	570	532	487	76.4
11	855	87.9	632	552	512	475	73.4

Tubes, Set #3.

Charged @ 200, Dischg'd @ 150 m-a.

	Chg'd 2 hrs.	3 hrs.	4 hrs.	5 hrs.	6 hrs.	7 hrs.	10 hrs.	Capacity on Overcharge (5 hr. run) 2/26/67.	Charged 6⅔ hrs. @ 150	5 hrs. @ 200	4 hrs. @ 250	3⅓ hrs. @ 300
5612	372	500	641	723	805	837	935	963	783	723	697	648
13	386	523	677	757	847	867	923	942	802	757	737	717
14	381	515	658	743	825	857	946	975	793	743	716	676
5615	371	478	615	692	762	792	925	987	762	692	661	612
16	375	496	462	542	672	810	972	986	550	542	655	707
17	377	505	652	740	827	861	967	1008	795	740	707	670
5618	372	501	635	717	792	820	897	935	775	717	696	657
19	377	497	642	712	786	817	893	930	777	712	695	647
20	370	491	617	698	756	790	860	927	748	698	663	628
5621	380	508	646	723	800	822	887	910	782	723	701	655
22	378	516	662	742	812	845	895	928	792	742	718	680
23	382	518	663	737	802	820	863	892	785	737	717	685
5624	345	440	547	617	645	711	807	977	550	617	582	548
25	345	437	548	620	677	717	797	977	665	620	587	547
26	345	445	555	625	692	725	837	1011	682	625	595	552

Sot #3. After 50 Hot Runs.

	Capacity on Overcharge	Overcharge Cap. % of Original	Charged 6 2/3 hrs. @ 150 ma	5 hrs @ 200	4 hrs @ 250	3 1/3 hrs @ 300	5 hr. Chg. Cap. % of Original	
5612	892	92.7	622	567	547	472	78.5	
13	920	97.6	680	650	645	567	85.8	
14	920	94.4	656	622 x	570 x	525 x	84	
5615	955	96.7	647	583	550	450	84	
16	995	101	502 x	460 x	550 x	497 x	84.8	
17	1010	100	717	672	647	560	90.8	
5618	937	100.2	570 x	592 x	603 x	536	81.2	
19	975	104.8	707	663	625	555	93	
20	892	96.3	603 x	580 x	550 x	595	93	
5621	945	103.8	720	673	657	572	93	
22	967	104.2	650 x	580 x	625 x	620	78	
23	930	104	740	710	682	622	96.3	
5624	885	90.6	587	550	522	460	89	
25	805	82.4	525 x	503 x	500	427 x	81	
26	860	85	575	512	492	435	82	

Runs marked "x" were bad, low voltage curves. Seems to indicate bad contacts internally.

6/3/07

After 100 Hot Runs.

	Capacity on Overcharge	Overcharge Cap. % of Original	Chg'd 6 2/3 hrs. @ 150 m-a.	5 hrs. @ 200.	4 hrs. @ 250.	3 1/3 hrs. @ 300.	5 hr. Chg. Cap. % of Original.
5612	915	95	645	590	527	495	81.6
13	900	95.5	692	646	600	575	85.3
14	928	95.1	685	625	577	566	84.1
5615	912	92.4	615	545	475	437	78.7
16	982	99.6	708	632	575	547	116.6
17	960	95.3	695	640	575	565	86.5
5618	920	98.4	697	637	577	537	88.9
19	972	104.5	712	658	597	562	92.3
20	845	91.1	687	642	610	567	92.1
5621	918	100.7	700	655	595	570	90.6
22	920	99.2	707	620 x	500 x	590	83.5
23	912	102.2	730	680	617	605	92.2
5624	775	79.3	575	507	450	437	82.2
25	670	68.6	472	422	385	353	68.1
26	650	64.2	450	387	342	325	61.9

Note — #5622 is the only cell which has a bad curve now. The ones that were low in voltage before have all improved.

After 150 Hot Runs

Lot #3.

	Capacity on Overcharge		Charged 6⅔ hrs. @ 150	5 hrs. @ 200	4 hrs. @ 250	3⅓ hrs. @ 300	
5612	983		673	622	565	502	
13	900		685	652	620	560	
14	967		677	642	605	547	
5615	930		592	525	485	416	
16	972		637	580	527	475	
17	976		660	615	575	510	
5618	940		560	625	590	512	
19	980		665	615	570	495	
20	840		655	625	590	547	
5621	895		672	627	600	550	
22	932		680	640	620	551	
23	875		683	652	622	560	
5624	760		520	472	432	373	
25	642		447	412	377	325	
26	610		418	395	350	302	

After 200 Hot Runs.

	Capacity on Overcharge.		Charged 6⅔ hrs. @ 150.	5 hrs. @ 200.	4 hrs. @ 250.	3⅓ hrs. @ 300.	
5612	910.		642	562	527	487	
13	812		653	587	577	550	
14	867		682	602	572	540	
5615	882		617	530	495	452	
16	912		650	545	500	465	
17	900		645	563	520	477	
5618	897		680	585	557	505	
19	932		682	595	548	510	
20	805		635	555	522	480	
5621	847		670	596	555	520	
22	830		655	577	535	495	
23	818		667	590	560	530	
5624	717		510	452	430	390	
25	712		505	450	427	387	
26	583		427	375	342	312	

Tubes, Set #4.

Charged @ 200, Discharg'd @ 150 m-a.

	Charg'd. 2 hrs.	3 hrs.	4 hrs.	5 hrs.	6 hrs.	7 hrs.	10 hrs.	Capacity on 5th Overcharge (5th run) 3/22/02.	Average E.D. of Discharge. (Overcharge Run.)	Charged 6 2/3 hrs. @ 150.	5 hrs. @ 200.	4 hrs. @ 250	3 1/3 hrs @ 300	
5876	382	495	610	720	793	830	943	1080	1.10	790	720	700	652	27% NaOH
77	392	506	625	742	813	867	970	1125	"	822	742	720	687	"
78	365	475	587	700	765	823	932	1117	"	785	700	671	625	"
5879	400	525	646	767	837	900	970	1165	1.137	842	767	743	702	25% NaOH.
80	400	522	632	756	832	882	995	1167	"	837	756	721	685	"
81	393	516	628	756	832	882	997	1180	"	835	756	721	685	"
5882	400	543	658	782	867	920	1025	1130	1.157	840	782	743	697	23% NaOH.
83	393	515	623	743	817	867	967	1080	"	820	743	702	668	"
84	395	518	622	740	815	867	972	1082	"	820	740	702	668	"
5885	390	518	630	745	825	875	995	1082	1.177	820	745	700	650	21% NaOH.
86	396	536	652	775	860	920	1025	1122	"	850	775	731	688	"
87	400	536	647	765	843	900	1012	1120	"	838	765	722	688	"
5888	396	542	661	783	870	932	1050	1162	1.20	857	783	731	691	19% NaOH.
89	398	535	650	771	863	922	1050	1150	"	857	771	715	690	"
90	391	538	661	775	862	923	1067	1150	"	843	775	717	672	"
5891	373	520	623	722	812	873	1030	1135	1.212	815	722	670	647	17% NaOH
92	397	557	680	801	890	950	1100	1186	"	862	801	740	700	"
93	397	546	666	773	865	925	1070	1167	"	850	773	712	683	"
5894	398	527	642	750	841	907	1068	1170	1.222	827	750	700	648	15% NaOH
95	397	557	690	807	907	962	1100	1212	"	830	807	662	702	"
96	385	532	645	751	840	902	1067	1155	"	832	751	675	637	"
5897	398	541	662	770	865	927	1073	1170	1.237	850	770	710	670	13% NaOH
98	398	533	662	763	857	917	1075	1175	"	837	763	700	640	"
99	398	540	657	751	850	910	1070	1187	"	822	751	685	662	"

Lot #4.

After 50 Hot Runs

	Capacity on Overcharge	Overcharge Capacity % of Original	Charged 6⅔ hrs. @ 150 m-a.	5 hrs. @ 200.	4 hrs. @ 250.	3⅓ hrs. @ 300.	5 hr. Chg. Cap. % of Original
5876	850	78.6	682x	607	517	477	84.4
77	995	88.4	420x	580	522	592	78.1
78	1050	94	732x	642	581	547	91.8
5879	1042	89.6	725x	637	581	550	83
80	1067	91.4	727x	637	577	545	84.3
81	1050	89	755x	690	647	622	91.3
5882	1132	100	787	717	660	612	91.7
83	1032	95.6	728	672	607	575	90.6
84	1050	97	760	695	607	592	93.9
5885	1012	93.6	667	600	552	500	80.6
86	1102	98.2	750	680	630	595	87.7
87	1017	90.8	675x	612	567	550	80
5888	1115	95.9	765	685	622	586	87.5
89	1117	97.1	767	692	630	586	89.8
90	1092	95	730x	675	622	585	87
5891	1080	95.2	703x	632	575	548	87.6
92	1150	97	770	640	510	572	79.9
93	1142	98	766	687	617	577	89
5894	1150	98.3	745	650	592	550	86.6
95	1180	97.4	772	705	555	581	87.3
96	1127	97.6	745	692	598	568	89.5
5897	1110	94.9	792	485x	327	566	63
98	1110	94.5	822	760	700	665	99.7
99	1187	100	805	723	662	620	96.3

After 100 Hot Runs.

	Capacity on Overcharge	Overcharge Capacity % of Original	Charged 6⅔ hrs. @ 150 m-a.	5 hrs. @ 200.	4 hrs. @ 250.	3⅓ hrs. @ 300.	5 hr. Chg. Cap. % of Original
5876	892	82.6	625	530	461	443	73.6
77	967	86	655	575	507	490	77.4
78	995	89.1	670	587	525	491	83.9
5879	1007	86.4	665	585	525	502	76.2
80	985	84.4	615	552	500	470	73.1
81	1045	88.5	690	610	545	518	80.7
5882	1096	96.9	712	437x	571x	542x	81.4
83	1007	93.2	657	307	300x	438x	41.3
84	1050	88.8	690	620	385	338	83.8
5885	950	87.7	635	567	501	471	76.2
86	1096	97.5	730	660	591	561	85.1
87	970	86.6	630	570	510	480	74.5
5888	1082	93.2	712	640	577	543	81.8
89	1097	95.3	707	625	555	517	81
90	1080	93.9	705	622	553	517	80.3
5891	1077	94.8	700	627	543	510	86.9
92	1167	98.4	757	692	627	586	86.4
93	1140	97.8	715	645	576	537	83.5
5894	1140	97.4	710	622x	547x	510x	83
95	1173	96.8	735	500	527	617	61.9
96	1125	97.4	697	625	553	518	83.2
5897	1160	99.1	737x	671x	597x	560	87.1
98	1087	92.5	425	727	605	648	95.4
99	1187	100	740	672	605	560	89.5

Sot #4.
After 150
Hot Runs.

	Capacity on Overcharge	Overchg. Capacity % of Original	Charged 6 2/3 hrs. @ 150 m-a.	5 hrs. @ 200.	4 hrs. @ 250	3 1/3 hrs. @ 300	5 hr. Chg. Cap. % of Original	
5876	783	72.4	657	550	445	420	76.4	27
77	855	76	660	575	470	432	77.4	
78	835	74.8	672	597	487	457	85.3	
5879	867	74.4	672	582	495	470	75.8	25
80	867	74.3	650	547	455	425	72.4	
81	922	78.1	720	605	505	463	80.	
5882	1002	88.8	747	645	545	505	82.4	23
83	925	85.6	730	645	545	507	86.9	
84	953	87.9	747	650	552	515	87.8	
5885	885	81.6	650	555	465	425	74.5	21
86	1020	90.8	742	656	562	525	84.6	
87	912	81.5	650	555	475	437	72.6	
5888	1011	87	725	647	557	520	82.7	14
89	1035	90	747	642	548	512	83.3	
90	1007	87.5	725	617	527	487	79.7	
5891	1025 x	90.3	722 x	617 x	530 x	490 x	85.5	17
92	557	47	550	623	651	625	77.7	x Sow V.
93	1080	92.6	737	642	565	518	83.1	
5894	1067	91.1	750	653	557	505	87	15
95	x 1090	89.8	812	722	646	610	89.5	
96	1057	91.4	750	648	550	513	86.2	
5897	1103	94.4	780	680	600	570	88.3	13
98	1108	94	792	712	615	575	93.4	
99	1110	93.6	792	712	625	592	94.8	

After 200
Hot Runs

	Capacity on Overcharge	Overchg. Capacity % of Original	Charged 6 2/3 hrs. @ 150 ma	5 hrs. @ 200	4 hrs. @ 250	3 1/3 hrs @ 300	5 hr. Chg. Cap. % of Original	
5876	697	64.6	581	480	431	400	66.6	
77	692	61.5	537	498	447	405	67	
78	680	60.9	400	350	350	370	50	
5879	780	66.9	600	518	460	425	67.5	
80	762	65.4	582	485	425	395	64.1	
81	900	76.2	678	585	512	467	77.4	
5882	970	85.8	697	590	525	483	75.4	
83	920	85.1	653	568	512	480	76.4	
84	920	85	666	590	527	491	79.7	
5885	830	76.6	585	495	425	400	66.4	
86	1000	89	722	613	542	507	79	
87	825	73.6	580	497	427	397	65	
5888	1010	86.8	677	592	525	476	75.7	
89	1010	87.8	670	569	507	467	73.7	
90	997	86.6	655	561	498	466	72.4	
5891	1012	89.2	675	573	508	465	79.3	
92	947	79.9	592	545	541	552	68	
93	1082	92.9	680	617	552	522	79.9	
5894	1082	92.6	686	620	558	522	82.6	
95	1045	86.1	725	652	590	592	80.8	
96	1047	90.6	708	623	555	507	82.9	Best
5897	1047	89.4	707	580	527	567	75.3	
98	975	83	550	503	527	592	65.9	
99	1025	86.4	477	495	505	567	65.8	

Tubes, Set #5.

Charged @ 200, Dischg'd @ 150 m-a.

	Charged 2 hrs.	3 hrs.	4 hrs.	5 hrs.	6 hrs.	7 hrs.	10 hrs.	Capacity on Overcharge (5th run) 4/13	Charged 6 2/3 hrs. @ 150	5 hrs. @ 200	4 hrs. @ 250	3 1/3 hrs. @ 300	
5992	391	561	691	797	890 900	945	1062	1162 1155	887	797	788	722	21 % KOH + 2 g. Si OH
93	391	562	693	798	893	962	1067	1157	887	798	790	740	" "
94	396	575	711	822	917	987	1080	1145	901	822	816	770	" "
5995	370	540	677	778	862	937	1042	1125	872	778	748	690	17 % KOH + 2 g. Si OH.
96	373	542	683	785	867	942	1045	1120	875	785	757	700	" "
97	372	541	687	786	872	942	1052	1120	885	786	770	717	" "
5998	358	495	650	746	830	900	1015	1100	852	746	727	665	13 % KOH + 2 g. Si OH
99	355	485	645	736	825	902	1018	1115	852	736	720	662	" "
6000	340	475	622	715	797	872	1001	1100	830	715	700	647	" "
6001	393	575	738	841	942	950	1021	1135	937	841	830	800	21 % NaOH + 2 g. Si OH
02	386	563	720	821	920	912	1007	1110	922	821	821	770	" "
03	392	570	735	841	937	947	1012	1137	935	841	821	790	" "
6004	375	555	708	817	910	940	1001	1100	903	817	816	750	17 % NaOH + 2 g. Si OH
05	386	573	742	861	960	987	1040	1170	932	861	830	813	" "
06	390	575	750	865	970	975	1050	1177	940	865	830	805	" "
6007	381	567	730	840	935 942	965	1020	1130 1132	907	840	818	765	13 % NaOH + 2 g. Si OH
08	381	566	731	842	940	967	1032	1142	912	842	820	757	" "
09	382	568	741	857	950	972	1035	1125	925	857	822	786	" "

Note. 2 g. Si OH means this amount to each cell of 175 cc.

Set #5. After 50 Hot Runs.

	Capacity on Overcharge	Overchg. Cap. % of Original	Chg'd 6⅔ hrs @ 150 m-a.	5 hrs. @ 200	4 hrs. @ 250	3⅓ hrs @ 300	5 hr. Chg. Cap. % of Original
5992	1176	101	787	747	662	632	93.8
93	1222	105.7	801	782	725	698	98.1
94	1225	107	795	775	600	622	94.3
5995	1180	104.8	793	747	667	645	96.1
96	1162	103.8	792	750	657	637	95.6
97	1165	104	796	752	685	662	95.7
5998	1137	103.2	765	712	647	605	95.5
99	1147	103	757	705	625	590	95.8
6000	1125	102.2	725	677	585	562	94.7
6001	1227	108	855	795	687	782	94.5
02	1225	110.3	910	880	775	817	107
03	1295	114	945	932	837	855	110.8
6004	1250	113.6	897	877	800	787	107.2
05	1275	109	905	880	807	782	102.1
06	1325	112.6	917	907	832	842	104.9
6007	1168	103.2	847	800	722	706	95.2
08	1166	101.9	846	782	715	703	92.9
09	1161	103.2	837	787	720	705	91.8

After 100 Hot Runs.

	Capacity on Overcharge	Overchg. Cap. % of Original	Chg'd 6⅔ hrs @ 150 m-a.	5 hrs. @ 200.	4 hrs. @ 250.	3⅓ hrs @ 300	5 hr. Chg. Cap. % of Original
5992	1112	95.7	780	717	655	627	90
93	1202	104	820	780	727	700	97.8
94	1192	104.2	827	793	747	722	96.4
5995	1165	103.6	817	767	692	655	98.7
96	1120	100	782	735	670	630	93.6
97	1142	102.1	792	750	700	662	95.4
5998	1102	100.1	757	705	652	612	94.5
99	1111	99.7	752	701	640	603	95.3
6000	1110	100.9	737	670	605	565	93.7
6001	1115	98.2	842	833	812	805	98.9
02	1212	109.2	887	850	812	785	103.4
03	1162	102.3	887	855	862	837	101.7
6004	1252	113.9	882	825	780	757	101.
05	1315	112.3	891	848	820	800	98.4
06	1325	112.7	900	830	790	767	94.
6007	1102	97.6	812	752	710	680	89.6
08	1117	97.6	817	782	735	720	92.9
09	1075	95.5	767	607	560	535	70.8

Lot #5. After 150 Hot Runs.

	Capacity on Overcharge	Overchg. Capacity % of Original	Chg'd 6 2/3 hrs @ 150 m-a.	5 hrs. @ 200	4 hrs. @ 250	3 1/3 hrs. @ 300	5 hr. Chg. Capy. % of Original
5992	1025	88.1	742	670	621	591	84
93	1140	98.6	805	745	717	667	93.4
94	1157	101	825	772	735	695	94
5995	1077	95.7	777	717	692	646	92.2
96	1035	92.4	750	687	637	598	87.6
97	1035	92.4	763	705	675	625	89.7
5998	1000	91	732	450	610	608	60.3
99	1015	91	705	645	646	583	87.6
6000	1015	92.3	730	647	615	592	90.5
6001	750	66	650	637	645	622	75.8
02	782	70.5	667	641	655	611	78
03	750	66	660	652	662	635	77.5
6004	1125	102.2	705	532	567	568	65.1
05	1150	98.3	760	658	685	656	74.3
06	1210	102.8	680	495	527	545	57.2
6007	920	81.4	680	625	611	590	74.4
08	950	83	685	625	612	608	74.2
09	900	80	682	625	587	572	72.9

After 200 Hot Runs.

	Capacity on Overcharge	Overchg. Capacity % of Original	Chg'd 6 2/3 hrs. @ 150 m-a	5 hrs. @ 200	4 hrs. @ 250	3 1/3 hrs. @ 300	5 Hr. Chg. Capy. % of Original
5992	1023	88.2	702	652	616	570	81.8
93	1115	96.5	787	732	707	660	91.8
94	1132	99	807	765	728	687	93
5995	1052	93.6	745	692	675	647	89
96	1022	91.4	738	675	621	585	86
97	1020	91.1	740	687	645	612	87.5
5998	977	88.8	700	652	607	575	87.5
99	990	88.8	692	652	612	580	88.6
6000	992	90.2	652	642	600	550	89.8
6001			Cut Out				
02							
03							
6004							
05							
06							
6007							
08							
09							

Lot #5. After 250 Hot Runs.

	Capacity on Overcharge		Chg'd 6 2/3 hrs. @ 150 m-a.	5 hrs. @ 200	4 hrs. @ 250	3 1/3 hrs. @ 300		
5992	900		680	607	565	550		
93	1110		821	742	697	670		
94	1120		825	757	720	696		
5995	1041		748	692	665	645		
96	992		731	662	607	587		
97	987		745	682	635	610		

Cells # 5998 - 6009 are Cut Out.

After 300 Hot Runs.

	Capacity on Overcharge			Charged 5 hrs. at 200			
5992				622			
93				745			
94				772			

1/10/08

Tubes. Special Electrolytes.

	Electrolyte	Chg'd 15 hrs. @ 300 Dischg'd @ 200. 1	2	3	4	5	Chg'd 6 hrs @ 200 Dischg'd @ 200 6	7	8	Chg'd 7 hrs. @ 200 Dischg'd @ 200 9	10	11	Overcharge Run 12
8701	21 % KOH	973	1143	1187	1187	1183	847	810	807	877	867	Special Run for a-V curve	1133
02	"	990	1171	1207	1193	1200	855	830	827	893	887		1155
8703	24 % KOH	983	1158	1180	1160	1163	848	820	817	883	880		1113
04	"	1040	1220	1227	1195	1203	883	850	841	920	907		1158
8705	27 % KOH	988	1152	1155	1140	1137	833	793	793	867	845		1075
06	"	991	1150	1157	1141	1138	837	796	795	870	843		1067
8707	21 % KOH +	1010	1200	1205	1195	1193	931	901	898	970	963		1217
08	2 g. SiOH	1035	1191	1235	1181	1190	930	901	900	971	970		1223
8709	24 % KOH +	1041	1190	1207	1180	1207	931	895	891	963	960		1227
10	2 g. SiOH	1015	1180	1188	1165	1187	920	891	887	955	953		1200
8711	27 % KOH +	1038	1160	1201	1203	1238	907	883	873	943	943		1191
12	2 g. SiOH	1028	1193	1230	1223	1248	923	890	881	953	951		1223

2/11/08.

Tubes # 8701-12.

After 25 Hot Runs.

			Chg'd 15 hrs. @ 300 Discharg'd @ 200				C-6 hrs. @ 200 D-@ 200		C-7 hrs @ 200 D-@ 200		—
	Electrolyte	Hot Run (130°F.) Chg'd 6½ hrs @ 200.	38	39	40	41	42	43	44	45	46
8701	21 % KOH	250	1118	1177	1177	1187	833	807	877	863	Special Run for A-V Curve
02	"	217	1127	1190	1181	1197	837	813	883	870	
8703	24 % KOH	227	1103	1138	1140	1128	777	763	827	810	
04	"	253	1127	1183	1173	1167	780	776	838	828	
8705	27 % KOH	217	1023	1070	1053	1048	723	698	757	740	
06	"	240	988	1058	1045	1045	720	697	743	727	
8707	21 % + 2 g. SiOH	420	1377	1338	1310	1307	927	927	987	991	
08	"	387	1365	1328	1293	1293	923	921	983	988	
8709	24 % + 2 g. SiOH	450	1310	1270	1218	1213	907	897	933	960	
10	"	443	1310	1271	1238	1230	910	900	953	963	
8711	27 % + 2 g. SiOH	487	1370	1325	1297	1280	903	898	947	947	
12	"	490	1383	1328	1297	1271	900	883	930	937	

After this the cells had 9 runs on 6 hour charges in the cold and also after standing.

See synopsis of these runs in front part of book.

3/30/08.

Tubes #8701 – 12.

After 50 ~~Hot~~ Runs.

	Electrolyte	Charged 15 hrs. at 300. Discharged at 200.				
		81	82	83	84	85
8701	21 % KOH	1173	1187	1191	1200	1200
02	" "	1183	1193	1200	1213	1213
8703	24 % KOH	1153	1127	1107	1120	1100
04	" "	1187	1133	1110	1107	1097
8705	27 % KOH	1040	1003	978	987	983
06	" "	1025	993	978	990	977
8707	21 % + 2 g. SiOH	1293	1267	1271	1300	1307
08	" "	1281	1213	1195	1193	1170
8709	24 % + 2 g. SiOH	1167	1187	1180	1233	1227
10	" "	1277	1237	1233	1250	1267
8711	27 % + 2 g. SiOH	1111	983	933	953	980
12	" "	967	800	733	735	735

	Charged 6 hrs. at 200 Discharged at 200					Charged 7 hrs. at 200 Discharged at 200		
	87	88	89	90	91	92 *	93	94
8701	867	823	775	817	910	758	703	683
02	877	828	786	831	921	776	853	850
8703	776	733	717	740	827	701	753	770
04	790	750	733	753	837	723	746	766
8705	700	677	660	674	740	643	663	671
06	680	657	643	657	720	633	647	666
8707	917	877	857	880	993	878	904	947
08	850	830	800	818	920	857	867	865
8709	900	860	843	857	967	917	917	927
10	913	867	851	868	977	910	900	927
8711	833	773	770	743	837	801	786	793
12	672	630	613	610	673	666	646	640

* Stood 2 weeks after run #91.

6/4/08.

Tubes #8701 - 12.

After 1.00 Hot Runs.

	Electrolyte	Chg'd 15 hrs. at 300					Chg'd 6 hrs. @ 200 m-a.		Charged 7 hrs. @ 200 m-a.			Mechanical Condition
		147	148	149	150	151	152	153	154	155	156	
8701	21 % KOH	1180	1200	1207	1187	1171	837	817	867	880	897	O.K.
02	"	1208	1227	1227	1207	1201	853	837	883	890	910	O.K.
8703	24 % KOH	1163	1117	1103	1070	1050	736	690	730	703	750	O.K.
04	"	1095	1033	1003	965	947	650	640	636	640	656	1 Ring broken. Seam opened a little
8705	27 % KOH	1003	920	880	860	848	616	580	576	561	583	O.K.
06	"	943	890	917	843	796	583	550	543	520	546	O.K.
8707	21 % + 2 g. SiOH	1057	1057	1030	978	960	867	857	890	806	833	3 Rings broken. Seam open
08	" "	967	827	780	733	653	653	650	656	588	600	4 " " . Seam wide open
8709	24 % + 2 g. SiOH	1000	817	750	680	650	661	663	666	590	600	3 " " " " "
10	" "	1047	960	937	918	890	867	853	860	783	815	2 " " Seam opened little
8711	27 % + 2 g. SiOH	920	807	800	775	763	790	767	770	686	700	Rings O.K. Badly swelled
12	" "	690	183	0	Split - mix out.							

[ITEM FOUND IN BOOK]

x Average
o + Stem

Tests of Commercial Lalande Cells to ~~Feb. 12, 1910.~~ Jan 1, 1910
(~~Except tests where weights were not taken~~)

Exp. No.	Type Cell	Gms. CuO	Gms. Zn	Rate	A-H to .3V	
729	BSCO #1	658	708	2	382	
730	"	651	702	4	325	
731	"	619	693	6	246.5	
~~732-34~~	~~"~~	~~—~~	~~—~~	~~Spec.~~	~~345 (av.)~~	See below
820	300 Q-N BSCO	x 410	x 642			3½" x 4" oxide
897	Edison SS	x 602	x 678	3	297.5	
898	" M	x 680	x 864	3	369	
901	" Q	x 295	ox 446	1.5	175	
1074	Edison SS	x 580	x 651	1.5	311	
1075	" S	x 608	x 690	"	323	
1076	BSCO #1	—	—	"	x 373	
1231	BSCO #1-9 amp	—	—	3	x 381.5	
1232	BSCO #1	—	—	"	x 331	
1359	BSCO #1-9 amp	—	—	4	x 356	
732	BSCO #1	—	—	4 a 10 h rest 14 h.	344	
733	"	—	—	4 a 30 h rest 2 wks	343	
734	"	—	—	10 hrs @ 2 2 " " 10	348	
736	"	—	—	4	333	
737	"	—	—	"	325	Same temp., KOH elec. sp. gr. 1.270
738	"	—	—	"	353	33% KOH
739	BSCO #3	—	—	"	278	
740	BSCO #1	—	—	"	328	Stood 2 wks before reading
745	Edison R	520	320	Not	tested	Should have [illegible] 354 g. Zn 555 g. CuO.
807-809	BSCO #1	x 648	—	3	347	Baillie Zn
810-812	"	x 647	—	"	222	G. W. L. "
818	"			3		Compared in Banks
820	BSCO (300 Q-N)	410	321			

[ITEM FOUND IN BOOK]

912-920	BSCO#1	Stand Tests
928-929	"	Reg. + w. lowered Zincs
958 959	"	Test of Castner + Solvay Soda
960-961	"	Stand Test " " "
945-947	BSCO#1+5	In 6x8 jars w. diff conc Soln
969, ~~970~~	BSCO#1 Imp	Zn 401 g. Dis @ 4 242 a-h
970	" —	" 323 "
1015-1017	Schoenmehl, B amps + BSCO#1	1.5 amps

Calculations:

Edison "Q" Zinc $2\frac{3}{4} \times 2\frac{3}{4}$
Total net weight 197 g.
Edison "R" Zinc $3\frac{5}{8} \times 3\frac{5}{8}$
Tot. wt. net. 354 g.
Edison "SS" Improved 6" x 3.3"
401 g. per plate net.
Edison "M" Imp 6" x 3.3"
462 g. per plate net